

Order No. MTNC031147C1

B19

# Service Manual

HDTV MONITOR


PT-47WXD63G / PT-53WXD63G

P9



**Panasonic®**

## IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by  in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturers specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

## 1. Safety precautions

### **General guidelines**

An isolation transformer should always be used during the servicing of a receiver whose chassis is not isolated from AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks. It will also protect the receiver from being damaged by accidental shorting that may occur during servicing. When servicing, observe the original lead dress, especially in the high voltage circuit. Replace all damaged parts (also parts that show signs of overheating.)

Always replace protective devices, such as fuse paper, isolation resistors and capacitors, and shields after servicing the receiver. Use only manufacturer's recommended rating for fuses, circuit breakers, etc.

High potentials are present when this receiver is operating. Operation of the receiver without the rear cover introduces danger for electrical shock. Servicing should not be performed by anyone who is not thoroughly familiar with the necessary precautions when servicing high voltage equipment.

Extreme care should be practiced when handling the picture tube. Rough handling may cause it to implode due to atmospheric pressure. (14.7 lbs per sq. in.). Do not nick or scratch the glass or subject it to any undue pressure. When handling, use safety goggles and heavy gloves for protection. Discharge the picture tube by shorting the anode to chassis ground (not to the cabinet or to other mounting hardware). When discharging connect cold ground (i.e. tag ground lead) to the anode with a well insulated wire or use a grounding probe. Avoid prolonged exposure at close range to unshielded areas of the picture tube to prevent exposure to x ray radiation.

The test picture tube used for servicing the chassis at the bench should incorporate safety glass and magnetic shielding. The safety glass provides shielding for the tube viewing area against x ray radiation as well as implosion. The magnetic shield limits the x ray radiation around the bell of the picture tube in addition to the restricting magnetic effects. When using a picture tube test jig for service, ensure that the jig is capable of handling 50kV without causing x ray radiation. Before returning a serviced receiver to the owner, the service technician must thoroughly test the unit to ensure that it is completely safe to operate. Do not use a line isolation transformer when testing.

### **Leakage current cold check**

Unplug the A.C. cord and connect a jumper between the two plug prongs. Measure the resistance between the jumpered AC plug and exposed metallic parts such as screwheads, antenna terminals, control shafts, etc. If the exposed metallic part has a return path to the chassis, the reading should be between 240k  $\Omega$  and 5.2M  $\Omega$ . If the exposed metallic part does not have a return path to the chassis, the reading should be infinite.

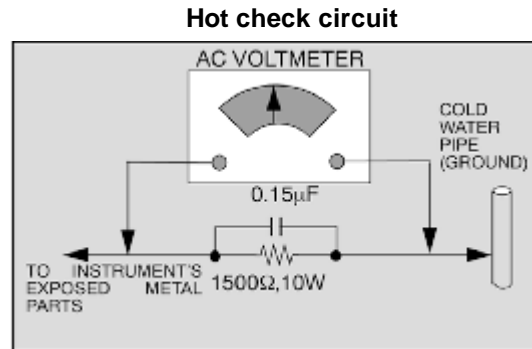
### **Leakage current hot check**

Plug the AC cord directly into the AC outlet. Do not use an isolation transformer during the check.

Connect a 1.5k  $\Omega$  10 watt resistor in parallel with a 0.15  $\mu$  F capacitor between an exposed metallic part and ground. Use earth ground, for example a water pipe.

Using a DVM with a 1000 ohms/volt sensitivity or higher, measure the AC potential across the resistor.

Repeat the procedure and measure the voltage present with all other exposed metallic parts. Verify that any potential does not exceed 0.75 volt RMS. A leakage current tester (such a Simpson model 229, Sencore model PR57 or equivalent) may be used in the above procedure, in which case any current measure must not exceed 0.5 milliampere. If any measurement is out of the specified limits, there is a possibility of a shock hazard and the receiver must be repaired and rechecked before it is returned to the customer.



#### Insulation test

Connect an insulation tester between an exposed metallic part and A.C. line. Apply 1080VAC/ 60Hz for 1 second. Confirm that the current measurement is 0.5mA ~ 2.0mA. Repeat test with other metallic exposed parts.

#### X-ray radiation

##### WARNING

The potential source of x-ray radiation in the PTV set is in the high voltage section and the picture tube.

##### NOTE

It is important to use an accurate, calibrated high voltage meter.

Apply all black video signals (1080i) and confirm high voltage measures  $31.5 \pm 1.0\text{kV}$ . If the high voltage is not within the range, change C514 (in D-Board) to 1800pF, 2000pF, 2400pF or 2700pF until the desired value is obtained. Apply NTSC white pattern and confirm the high voltage measures  $30.1 \pm 1.5\text{kV}$ . Apply HD 1080i white pattern and confirm the high voltage measures  $30.1 \pm 1.5\text{kV}$ .

## 2. About lead free solder (PbF)

##### NOTE

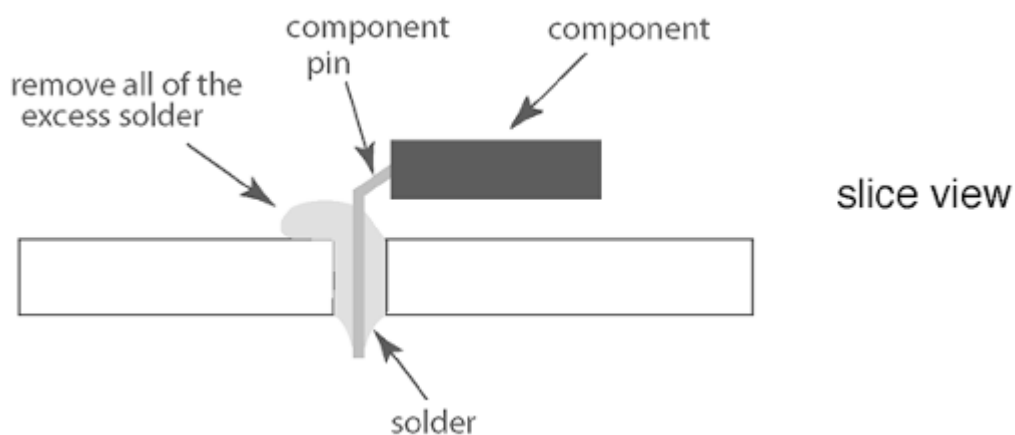
Lead is listed as (Pb) in the periodic table of elements. / In the information below, Pb will refer to lead solder, and PbF will refer to Lead Free Solder. / The lead free solder used in our manufacturing process and discussed below is (Sn+Ag+Cu). / That is Tin (Sn), Silver (Ag) and Copper (Cu) although other types are available.

This model uses Pb Free solder in it's manufacture due to environmental conservation issues. For / service and repair work, we'd suggest the use of Pb free solder as well, although Pb solder may be / used. / PCBs manufactured using lead free solder will have the "PbF" or a leaf symbol stamped on the / back of PCB.



**CAUTION**

- Pb free solder has a higher melting point than standard solder. Typically the melting point is 50 ~ 70 °F (30 ~ 40 °C) higher. Please use a high temperature soldering iron and set it to 700 ± 20 °F (370 ± 10 °C).
- Pb free solder will tend to splash when heated too high (about 1100 °F or 600 °C). / If you must use Pb solder, please completely remove all of the Pb free solder on the pins or solder area before applying Pb solder. If this is not practical, be sure to heat the Pb free solder until it melts, before applying Pb solder.
- After applying PbF solder to double layered boards, please check the component side for excess solder which may flow onto the opposite side.



**Suggested Pb free solder**

There are several kinds of Pb free solder available for purchase. This product uses Sn+Ag+Cu (tin, silver, copper) solder. However, Sn+Cu (tin, copper), Sn+Zn+Bi (tin, zinc, bismuth) solder can also be used.

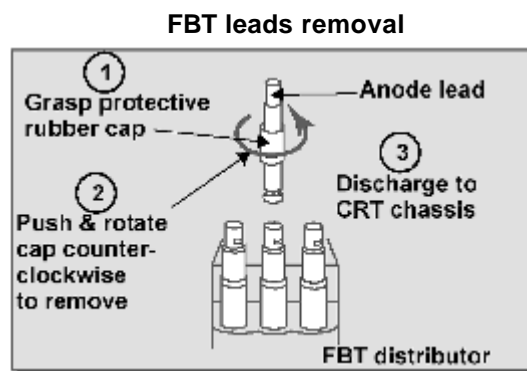


0.3mm X 100g	0.6mm X 100g	1.0mm X 100g
		

### 3. Important safety tests

#### Measuring H.V.

The anode caps are cemented to the CRTs. To gain access for high voltage measurement, remove the red CRT's anode lead from the flyback transformer distributor. Grasp the anode lead protective cap at its bottom and squeeze it against the locking cap body inside, rotate 1/4 turn counter clockwise and pull the anode lead sleeve out of the FBT distributor. Connect a high voltage positive lead from your H.V. meter to the FBT distributor, and the common negative lead to cold ground



#### Note:

Reinsert the anode lead into the FBT distributor until it is tightly and fully seated. Turn the locking cap clockwise to lock in place.

#### (EHT) Protector operation check

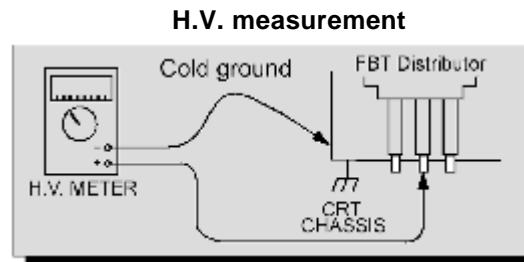
With the cabinet back removed, apply a nominal 120V A.C. to the PTV.

#### Over voltage test

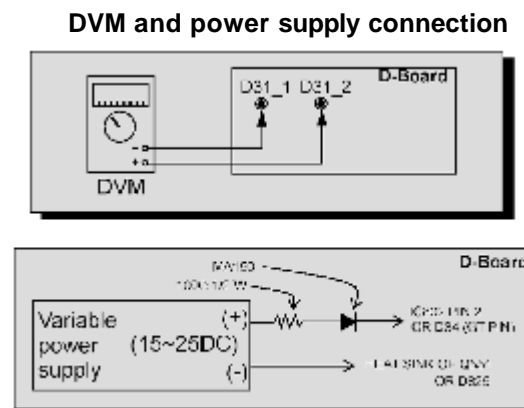
Preparation:

1. Turn PTV "OFF"
2. Connect a NTSC signal generator to the antenna terminal.
3. Connect DVM positive lead to D31 pin 2 and negative lead to D31

pin 1 on D-Board



4. Connect a H.V. meter (static type, class 0.1) with high voltage leads to high voltage distributor on FBT.



5. Connect the 15 ~ 25 V DC variable power supply positive lead to D34 or IC802 pin 2 (D Board) and negative lead to heat sink of Q551 or D825

Procedures:

1. Apply a NTSC white pattern.
2. Turn PTV ON.
3. Adjust the picture or brightness controls so that the DVM reads  $12.4 \pm 0.4$  volts.
4. Increase the variable power supply until set turns off. The set should turn off at  $12.4 \pm 0.4$  volts (DVM) and high voltage less than 36.4kV.
5. If the DVM reading is other than  $12.4 \pm 0.4$  volts, readjust picture or brightness control and repeat steps 3.
6. Turn off the variable supply and confirm that the set will turn on by pulling out AC plug socket and connecting it again.

## 4. Service notes

### NOTE

These components are affixed with glue. Be careful not to break or damage any foil under the component or at the pins of the ICs when removing. Usually applying heat to the component for a short time while twisting with tweezers will break the component loose.

### Leadless chip component (surface mount)

Chip components must be replaced with identical chips due to critical foil track spacing. There are no holes in the board to mount standard transistors or diodes. Some chips capacitor or resistor board solder pads may have holes through the board, however the hole diameter limits standard resistor replacement to 1/8 watt. Standard capacitor may also be limited for the same reason. It is recommended that identical components be used.

Chip resistor have a three digit numerical resistance code, 1st and 2nd significant digits and a multiplier. Example: 162 = 1600 or 1.6k  $\Omega$  resistor, 0 = 0  $\Omega$  (jumper).

Chip capacitors generally do not have the value indicated on the capacitor. The color of the component indicates the general range of the capacitance.

Chip transistors are identified by a two letter code. The first letter indicates the type and the second letter, the grade of transistor.

Chip diodes have a two letter identification code as per the code chart and are a dual diode pack with either common anode or common cathode. Check the parts list for correct diode number.

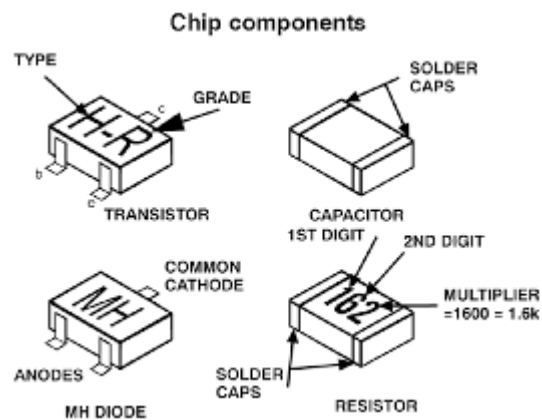
### Component removal

1. Use solder wick to remove solder from component end caps or terminal.
2. Without pulling up, carefully twist the component with tweezers to break the adhesive.
3. Do not reuse removed leadless or chip components since they are subject to stress fracture during removal.

### Chip component installation

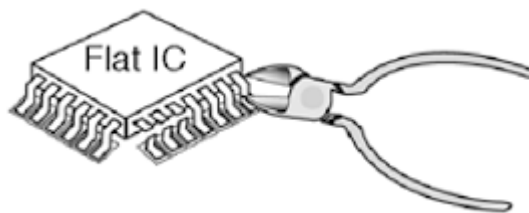
1. Put a small amount of solder on the board soldering pads.
2. Hold the chip component against the soldering pads with tweezers or with a miniature alligator clip and apply heat to the pad area with

**a 30 watt iron until solder flows. Do not apply heat for more than 3 seconds.**

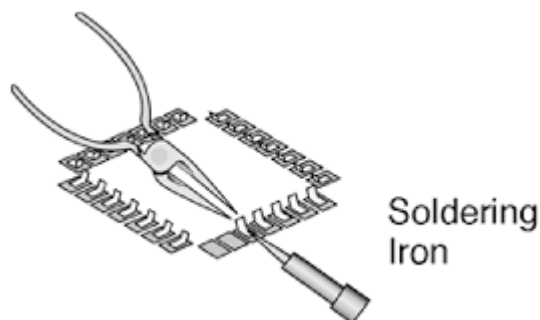


**How to replace flat ic (required tools)**

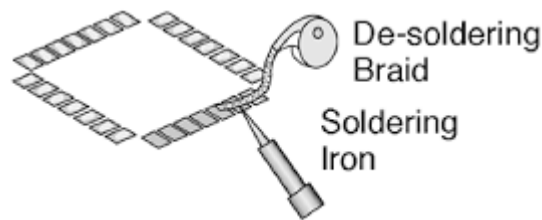
- 1. Remove the solder from all of the pins of a Flat IC by using a desolder braid**



- 2. Put the iron wire under the pins of the Flat IC and pull it in the direction indicated while heating the pins using a soldering iron. A small awl can be used instead of the iron wire.**



- 3. Remove the solder from all the pads of the Flat IC by using a desolder braid**



4. Position the new Flat IC in place (apply the pins of the Flat IC to the soldering pads where the pins need to be soldered). Properly determine the positions of the soldering pads and pins by correctly aligning the polarity symbol



5. Solder all pins to the soldering pads using a fine tipped soldering iron



6. Check with a magnifier for solder bridge between the pins or for dry joint between pins and soldering pads. To remove a solder bridge, use a de solder braid as shown in the figure below



#### IMPORTANT


To protect against possible damage to the solid state devices due to arcing or static discharge, make certain that all ground wires are securely connected

#### CAUTION

The power supply circuit is above earth ground and the chassis cannot be polarized. Use an isolation transformer when servicing the receiver to avoid damage to the test equipment or to the chassis. Connect the test equipment to the proper ground(HOT or COLD) when servicing, or incorrect voltages will be measured.

**WARNING**

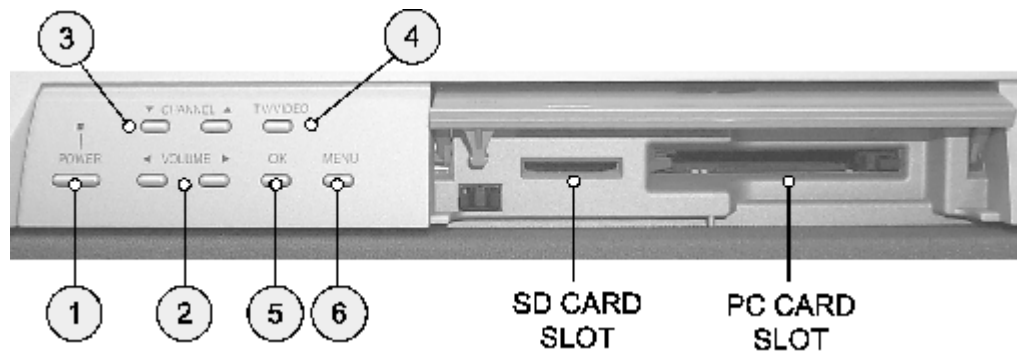
This receiver has been designed to meet or exceed applicable safety and x-ray radiation protection as specified by government agencies and independent testing laboratories.

To maintain original product safety design standards relative to x-ray radiation and shock and fire hazard, parts indicated with the symbol  on the schematic must be replaced with identical parts. Order parts from the manufacturer's parts center using the parts numbers shown in this service manual, or provide the chassis number and the part reference number.

For optimum performance and reliability, all other parts should be replaced with components of identical specification.

## 5. PTV Location of controls





#### QUICK REFERENCE BUTTON OPERATION

- 1 **POWER** - Press to turn ON or OFF.
- 2 **VOLUME** - Press to adjust sound level, settings and features on menu.
- 3 **CHANNEL** - Press to select programmed channels. Press to highlight desired features when menus are displayed.
- 4 **TV/VIDEO** - Press to select TV or one of the video inputs.
- 5 **OK** - Press to choose menu and sub-menu entry.
- 6 **MENU** - Press to display main menu or return one step backward in menus.

## 6. Receiver feature table

FEATURE/MODEL	PT-47WXD63GPT-53WXD63G
CHASSIS	AP830
MICRO	256K
MENU LANGUAGE	ENGLISH
CLOSED CAPTION	X
V-CHIP (USA/CANADA)	X
CHANNEL INFO BANNER	X
ATSC / QAM TUNING	X
VIDEO INPUT SKIP	SKIP
CHANNEL COUNT	181
PIP (1T), 2T PIP (2T), 2T SPLIT	2T SPLIT
2RF	X
REMOTE CONTROL (W/LIGHT)	EUR7627Z10
CRT SUPPLIER	MDDA (CENTAUR)
SCREEN	W/PROT SCREEN
CHASSIS	P9
COMB FILTER	MOTION ADP, 3D Y/C
HEC/VEC (X=BOTH)	X
NEW YNR	X
VM	X (DIGITAL)
V/A NORM (X=BOTH)	X
COLOR TEMP	X
AIP	X
FEATURE/MODEL	PT-47WXD63GPT-53WXD63G
PRESET/INPUT LABELING	X
VIDEO PICTURE MEMORY	X
DIGITAL SCAN RATE	1080i, 540p
NTSC LINE DOUBLER	540p PROGRESSIVE (NEW)
MTS/SAP/DBX	X
BUILT-IN AUDIO POWER	15Wx2 (10%)
No. OF SPEAKERS	4
BASS/BALANCE/TREBLE CONTROL	X
AI SOUND	X
SURROUND	X
SPATIALIZER/BBE	BBE
A/V IN (REAR/FRONT)	4(3/1)
A/V PROGRAM OUT	X
AUDIO OUT (FAO: F, VAO:V)	F
COMPONENT INPUT (Y, Pb, Pr)	2
S-VIDEO INPUT (REAR/FRONT)	2/1
HDMI/HDCEP INPUT	1
DIGITAL AUDIO OUT (AC-3/PCM)	1
CableCARD SLOT	1(BACK)
(PCMCIA/SD)	1(FRONT)



**Note:**

Specifications are subject to change without notice or obligation.

## 7. Board description table

BOARD	PART NUMBER	DESCRIPTION
A-BOARD	TNP2AH051	MAIN CHASSIS
D-BOARD	TNP2AH056	POWER SUPPLY
* DC-BOARD	TNP2AA151	CONVERGENCE CIRCUIT
* DG-BOARD	TNP2AA132	MPU, VIDEO SIGNAL PROCESSING
* DV-BOARD	TNP2AA133	HDMI DECODER
* DT-BOARD	TNP2AA144	HIGH DEFINITION TUNER
G-BOARD	TNP2AA150	FRONT A/V INPUT
H-BOARD	TNP2AA134	REAR A/V INPUTS
K-BOARD	TNP2AA149	KEYBOARD PANEL
* JG-BOARD	TNP2AA140	SD,PC JPEG VIEWER
LB-BOARD	TNP2AA147AB	BLUE PRT
LG-BOARD	TNP2AA146AB	GREEN PRT
LR-BOARD	TNP2AA145AB	RED PRT
R-BOARD	TNPA0615AB	IR SENSOR
T-BOARD	TNP2AA136	SUB-POWER

### NOTE

When ordering a replacement board assembly, append an “S” to the board number

### EXAMPLE

To order the A Board, the replacement board is TNP2AH051S

\*

DC-Board, DG-Board, DV-Board, DT-Board and JG-Board are non-serviceable boards, except for the connectors JG1, JG2, JK5001, JK5002, JK8002 and JK8003. If any of these boards are defective, replace it with a new one.

## 8. Location of controls (EUR7627Z10 remote)

<b>POWER</b>
Press to turn ON and OFF.
<b>TV - VCR - DVD - DBS - RCVR</b>
Press to select a component.
<b>TV/VIDEO</b>
Press to select TV or Video mode.
<b>SD</b>
Press to access the JPEG viewer menu.
<b>MUTE</b>
Press to mute sound.
<b>ASPECT</b>
Press to change the aspect ratio of image.
<b>MENU</b>
Press to access the menu.
<b>KEYBOARD</b>
Press to select any channel.
<b>R-TUNE</b>
Press to switch to previously viewed channel or video mode.
<b>COMPONENT - PIP - SEARCH</b>
Press to control the component functions. Press to access the PIP and search functions.



<b>SAP</b>
Press to access the secondary audio program broadcast.
<b>LIGHT</b>
Press to illuminate the keypad.
<b>A &amp; B ANTENNA</b>
Press to select between antenna A or B inputs.
<b>RECALL</b>
Press to display time, channel sleep timer and other options.
<b>BBE</b>
Press to turn BBE sound ON or OFF.
<b>OK</b>
Press to select an adjustment or option.
<b>VOL</b>
Press to adjust TV sound and navigate in menus.
<b>CH</b>
Press to select next or previous channel and navigate in menus.
<b>EXIT</b>
Press to exit adjustments or menus.

#### Note:

For additional information for this remote please refer to the owner's manual section remote operation, listed on the parts list section.

## 9. Auto diagnosis feature

This receiver incorporates a self diagnosis feature. With this feature it will be easier for the technician to detect failures. There is a LED located by the keyboard on the front panel, this LED will start flashing when SOS is detected by the circuits located in specific areas, depending on how many times the LED is flashing, this will indicate what circuit should be checked. Make a count of flashing and see the table shown below. Please use this feature effectively especially for intermittent problems.

NUMBER OF FLASHES	POSSIBLE CAUSE
1	POWER SUPPLY AND/OR VERTICAL
2	IC1006 (DG-BOARD)
3	CONVERGENCE (DC-BOARD)
4	HHS (FLYBACK)
5	GC2M (DG-BOARD)
6	GC2S (DG-BOARD)
7	GC2V (DG-BOARD)
8	FAN

## 10. EEPROM copy jig

This PTV has a feature that allows to clone convergence from main EEPROM data adjustments from a PTV to other by connecting a jig to the PTV set, or can be used to back-up data before making adjustments. A jig part number TXFJIG01SER, is available through Matsushita/Panasonic Services.

### Preparation:

To connect this jig, remove the lower back cover as instructed on disassembly for service section on this service manual and insert the jig into A10 connector located on A-Board. (See figure)

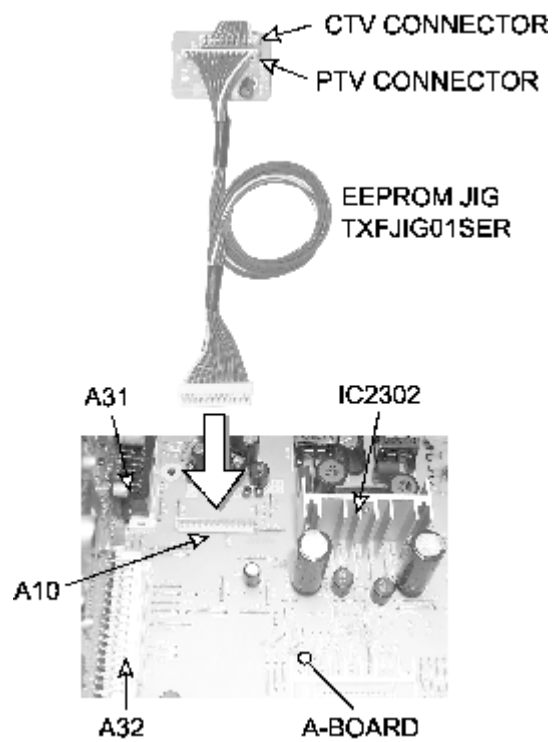
### Procedure to copy data:

1. Enter to service mode and display service menu (see page 23).
2. Select "AREA" DAC and then press OK button on remote to enter. Press VOL right/left to select one of the following options then press OK:
  - Select ALL to copy all main EEPROM data
  - Select ADJ to copy only adjustment data.
  - Select FIX to copy only fix data
3. To copy data from main EEPROM to jig, select "IN → EX" DAC and press OK button on remote.
4. To copy data from jig to main EEPROM, select "EX → IN" DAC and press OK button on remote.

### Procedure to copy convergence:

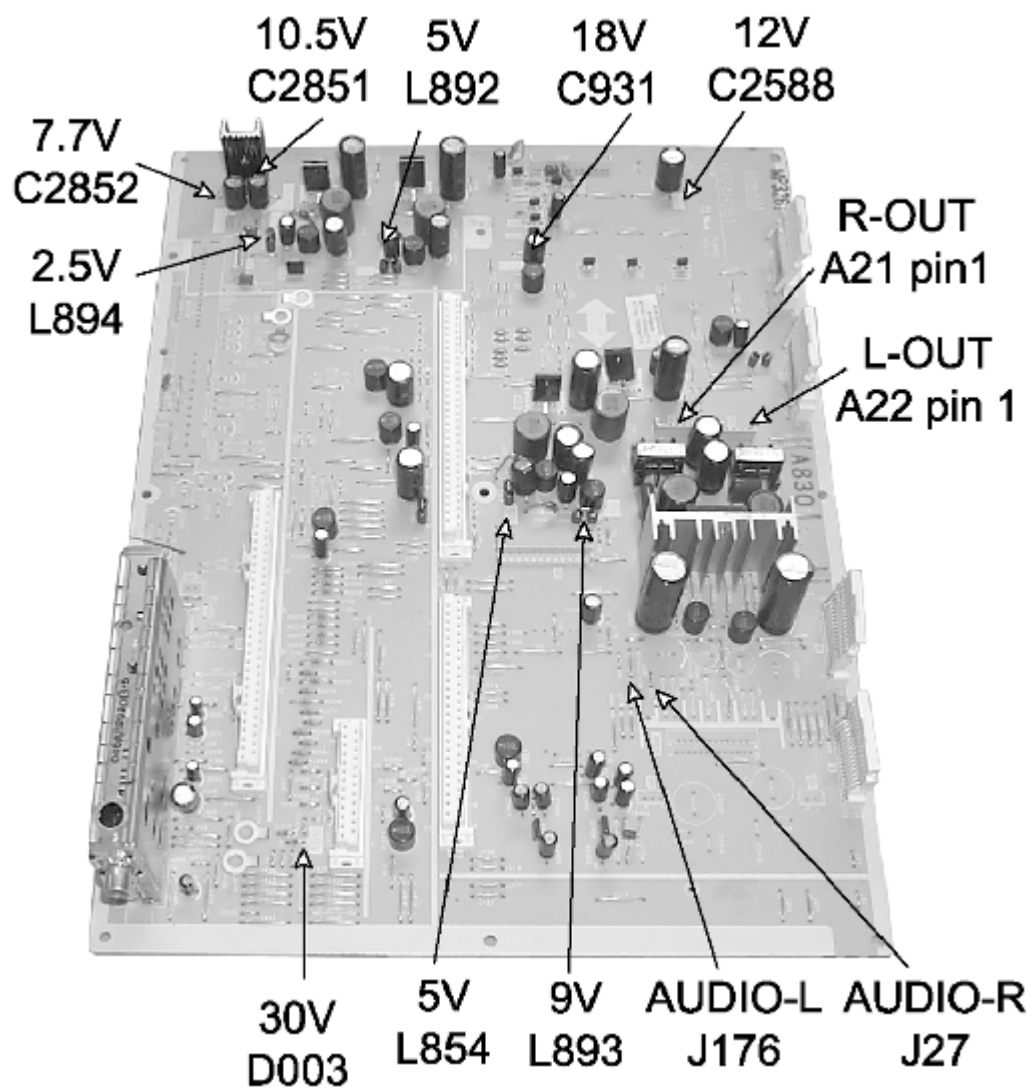
1. Enter to service mode and display service menu
  2. Select "FINE" DAC and press OK on remote.
  3. Press "8" on remote.
  4. Select from and then press OK on remote:
    - INT to copy data from internal EEPROM to jig
    - EXT to copy from jig to internal EEPROM.
  5. Select an option from the menu with CH keys and confirm with OK:
    - DEFAULT: default factory preset
    - CURRENT: to copy the current (receiver data or jig data) convergence adjustments to memory.
    - NOT USE: to back up data.
    - ALL: to copy all data.
- NOTE:
- The stated as default factory preset contain the factory DATA; Use this option when data was lost or when adjustment is lost completely.
6. Select destination to copy (INT or EXT) and confirm with OK.
  7. Once an option is selected the copy process begins.
  8. Once finished, the receiver shuts down for a moment to reinitialize.
  9. Remove the copy jig from A10.

EEPROM copy jig connection



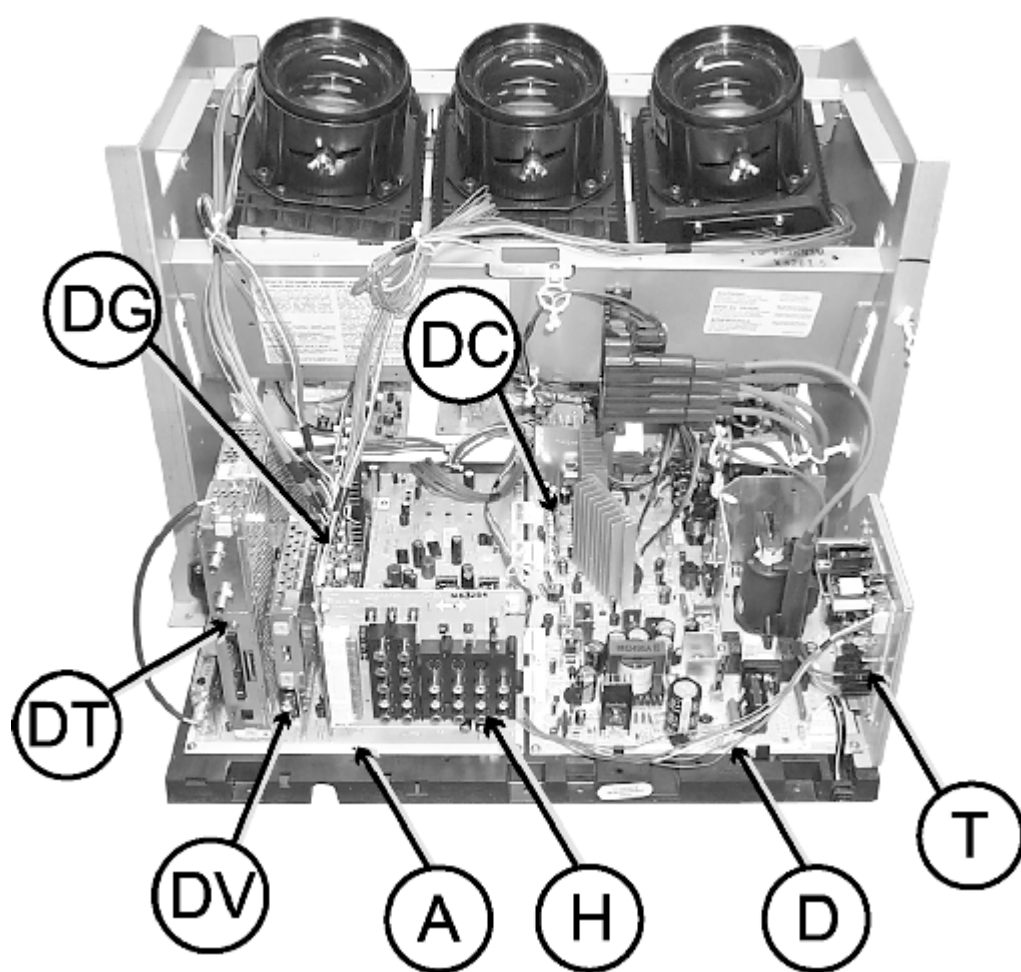
## 11. A-Board check points

A-Board check points

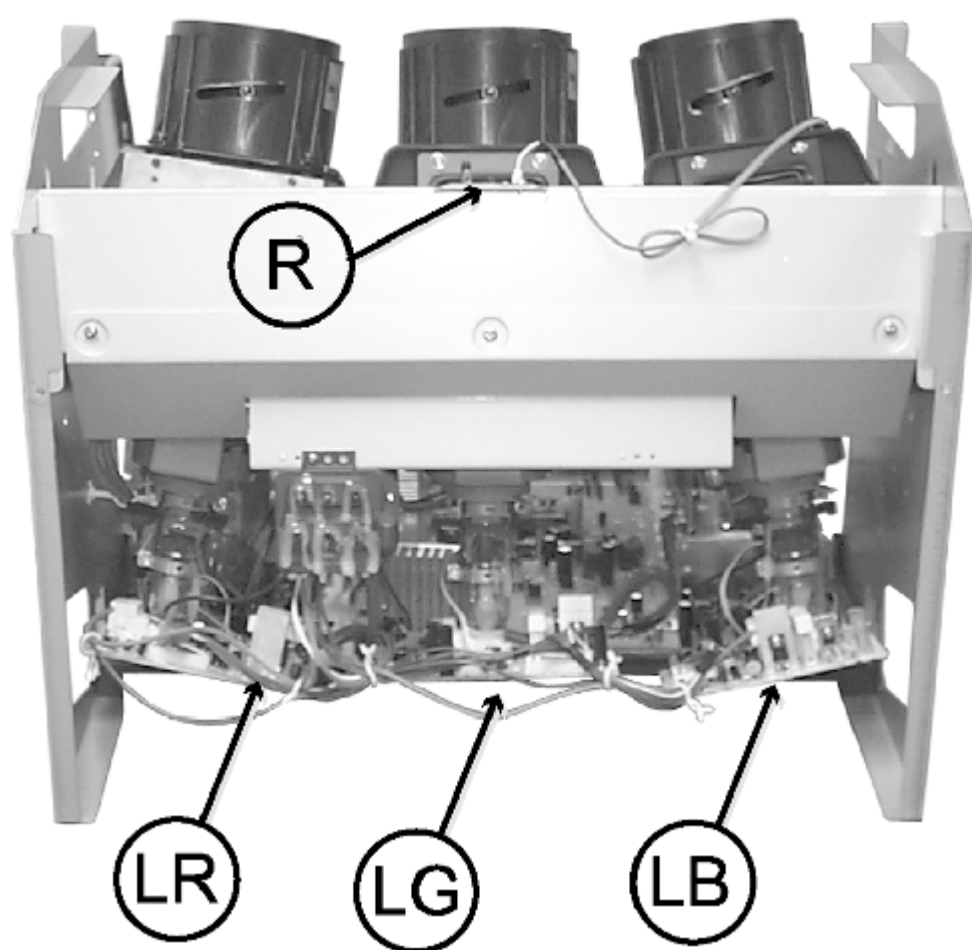


## 12. Chassis & boards layout (location of main components)

Chassis and boards layout

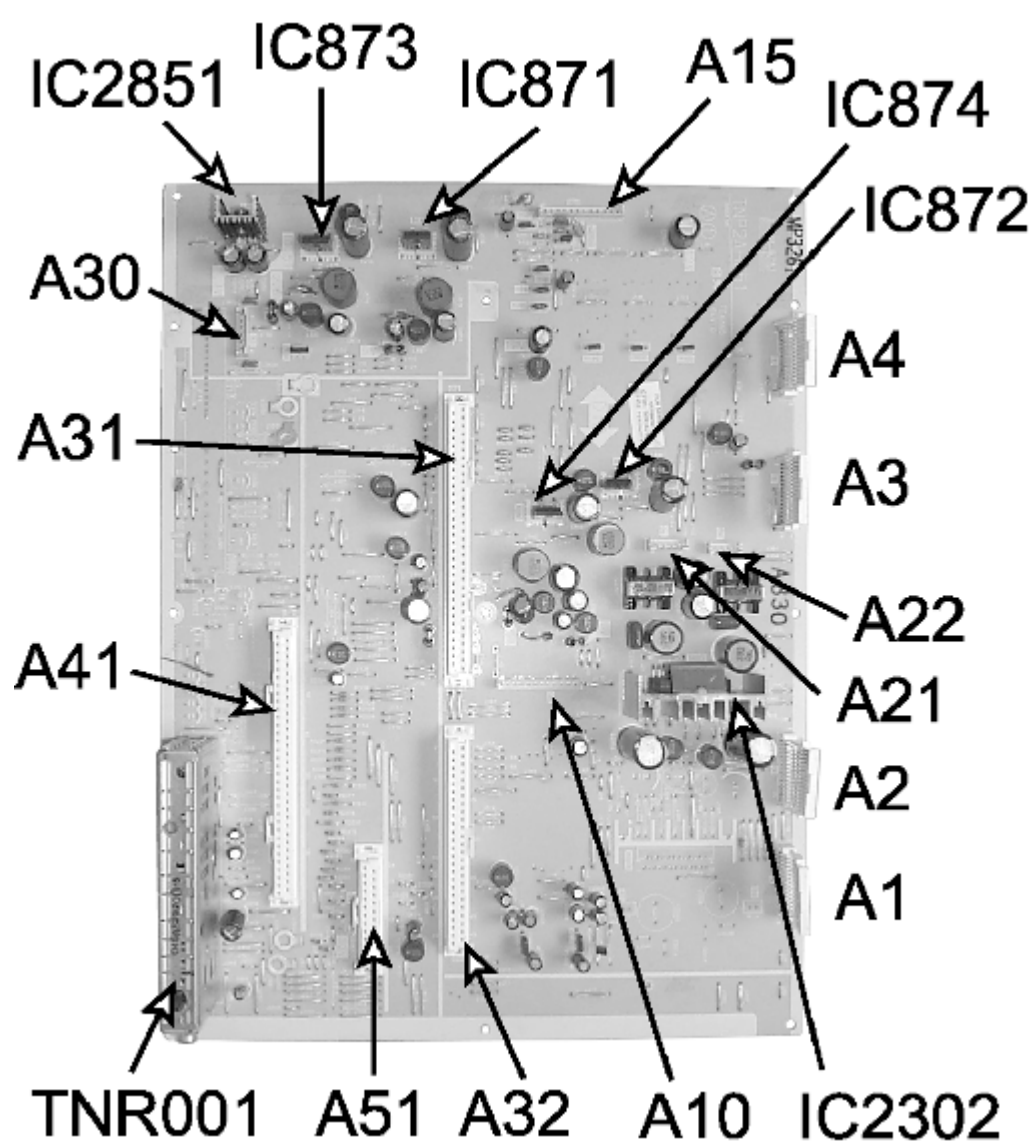


Chassis and boards (FRONT)

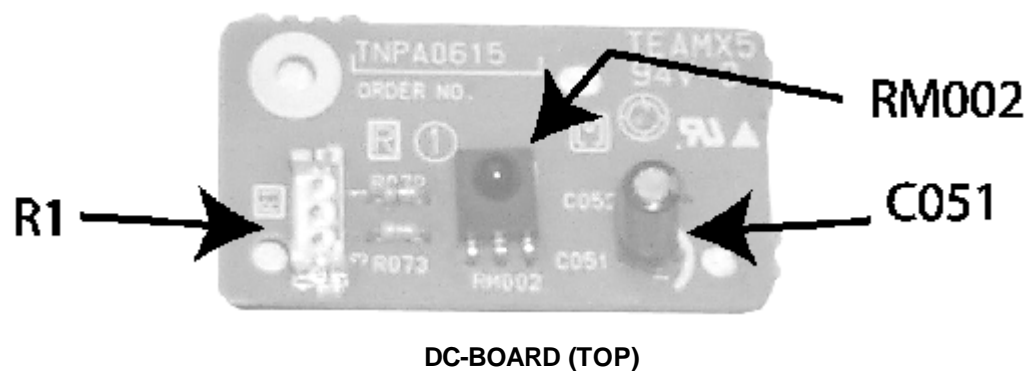
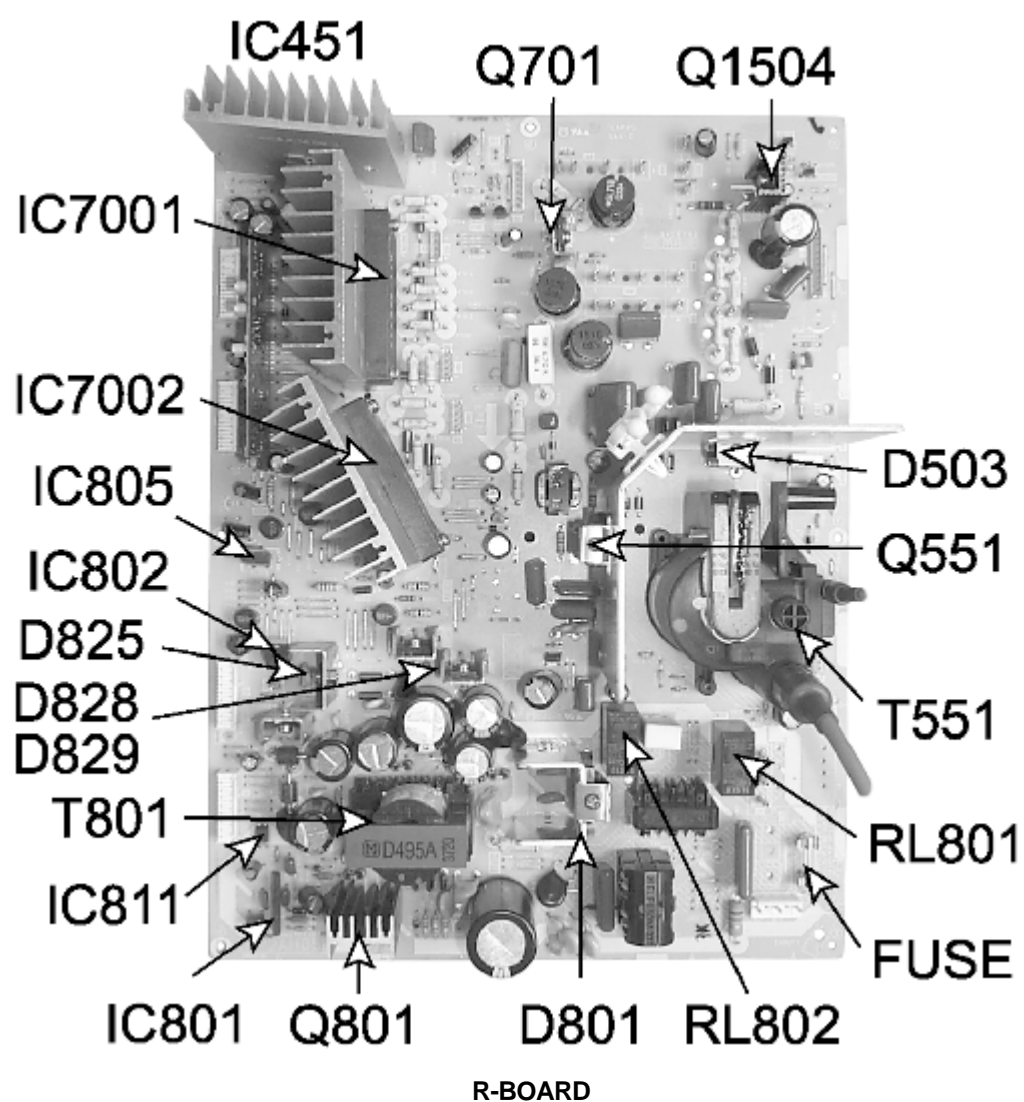


A-BOARD



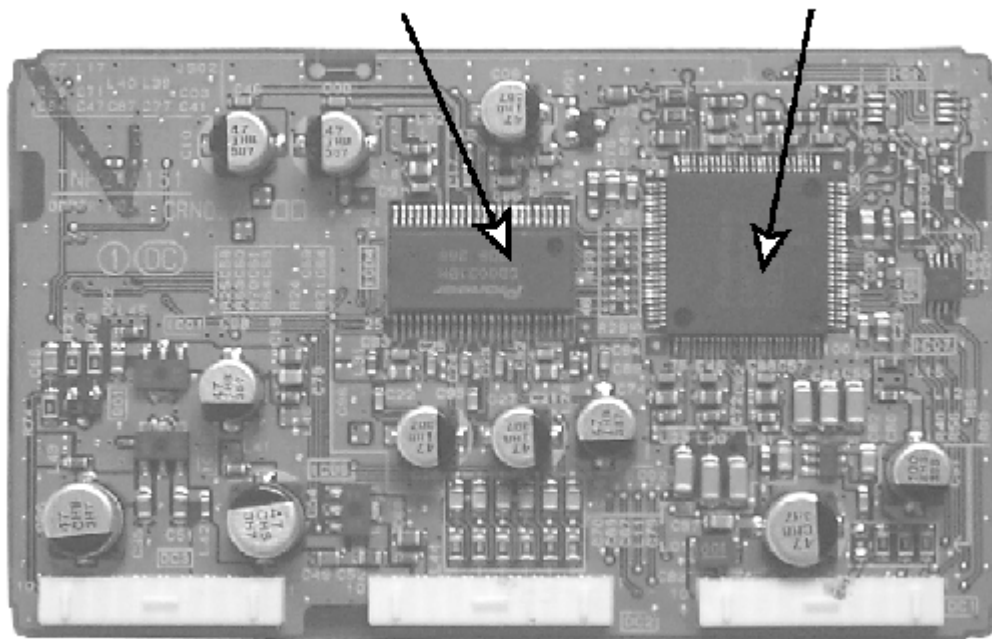


D-BOARD



**IC7104**

**IC7107**



**DC3**

**DC2**

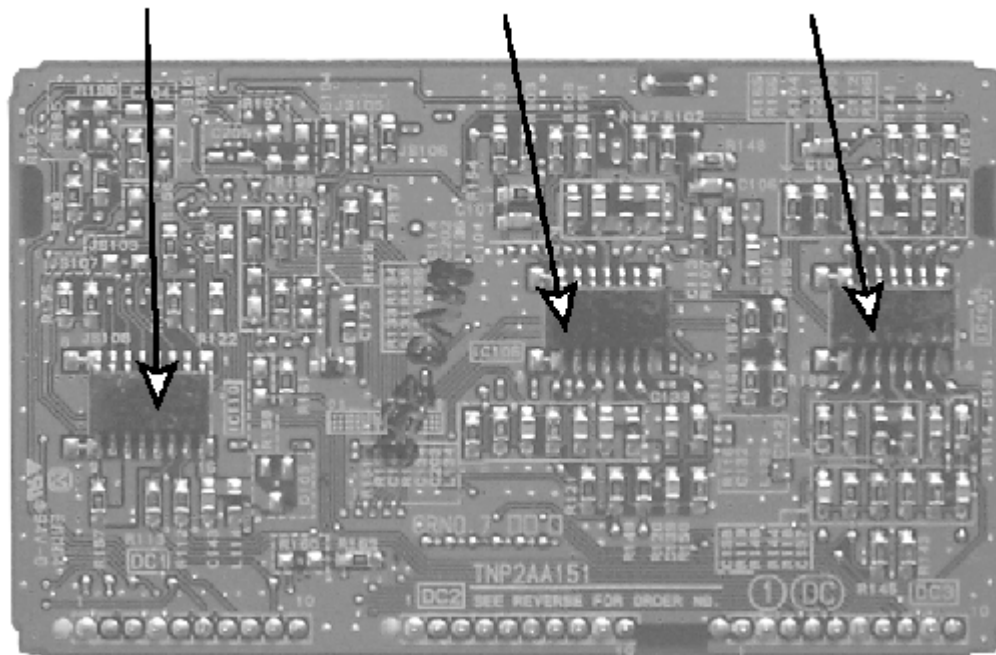
**DC1**

**DC-BOARD (BOTTOM)**

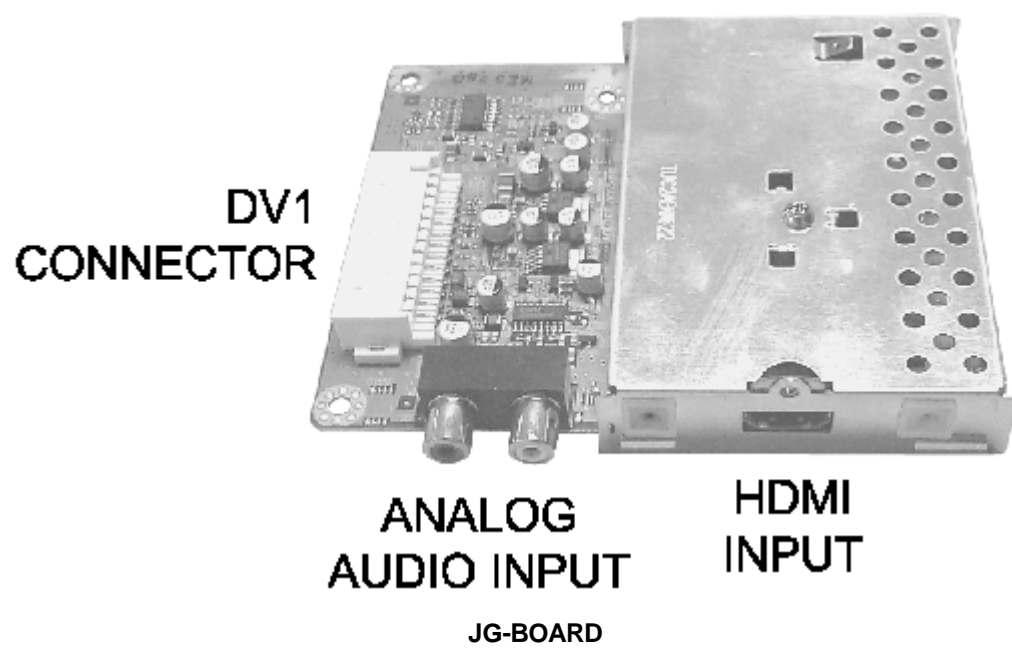
**IC7110**

**IC7106**

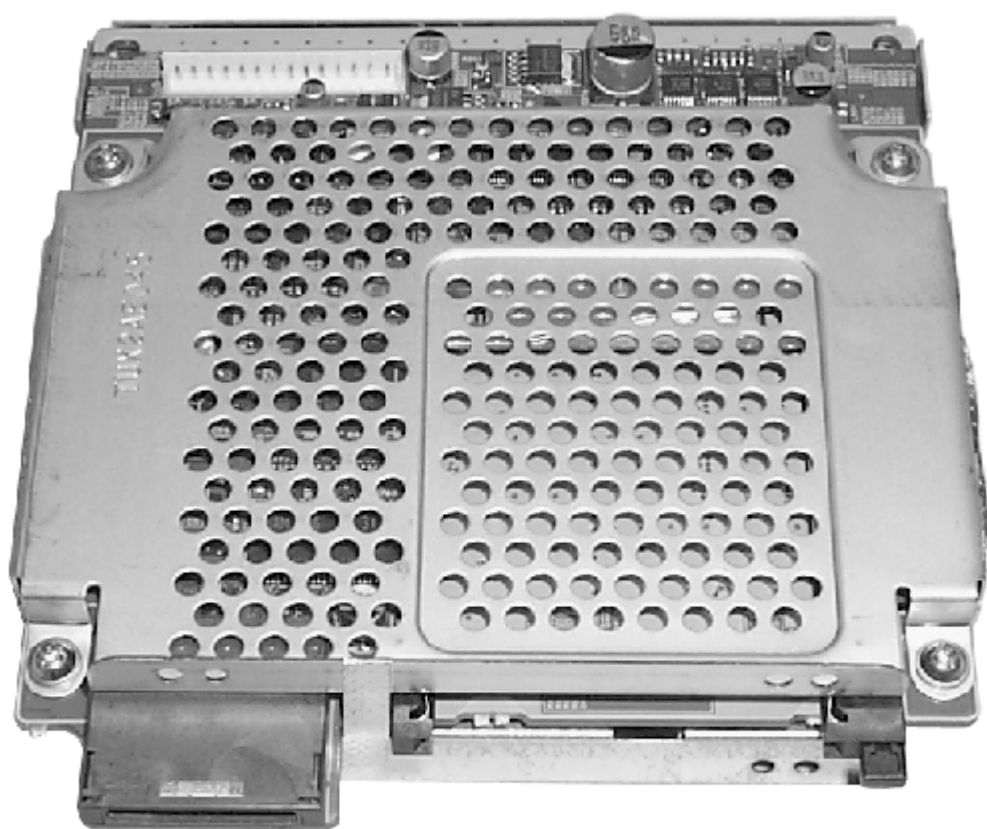
**IC7105**



**DV-BOARD**



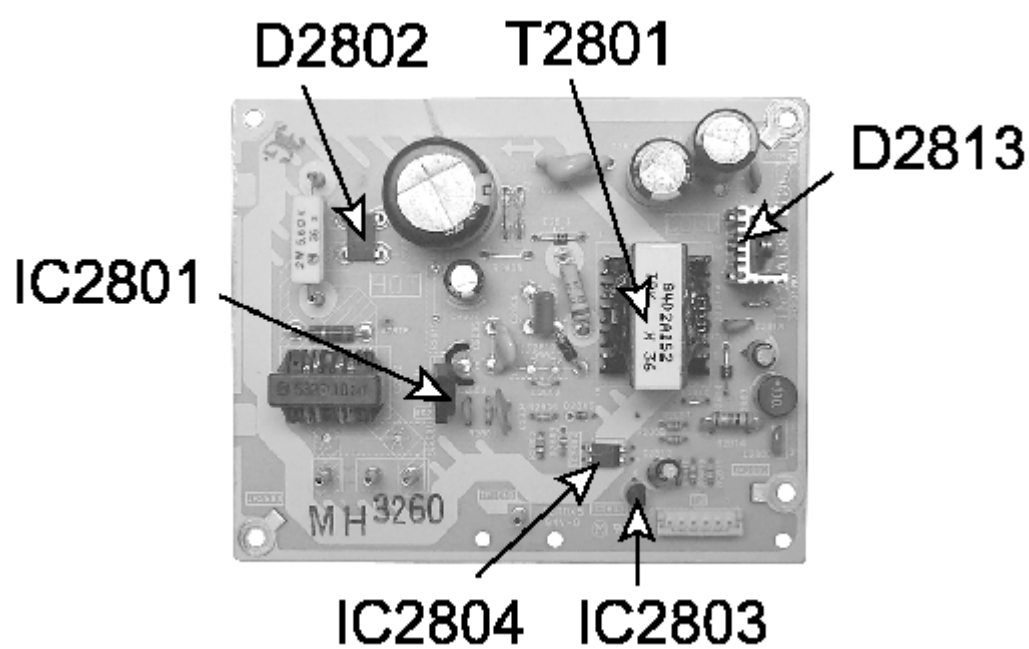
**JG3**



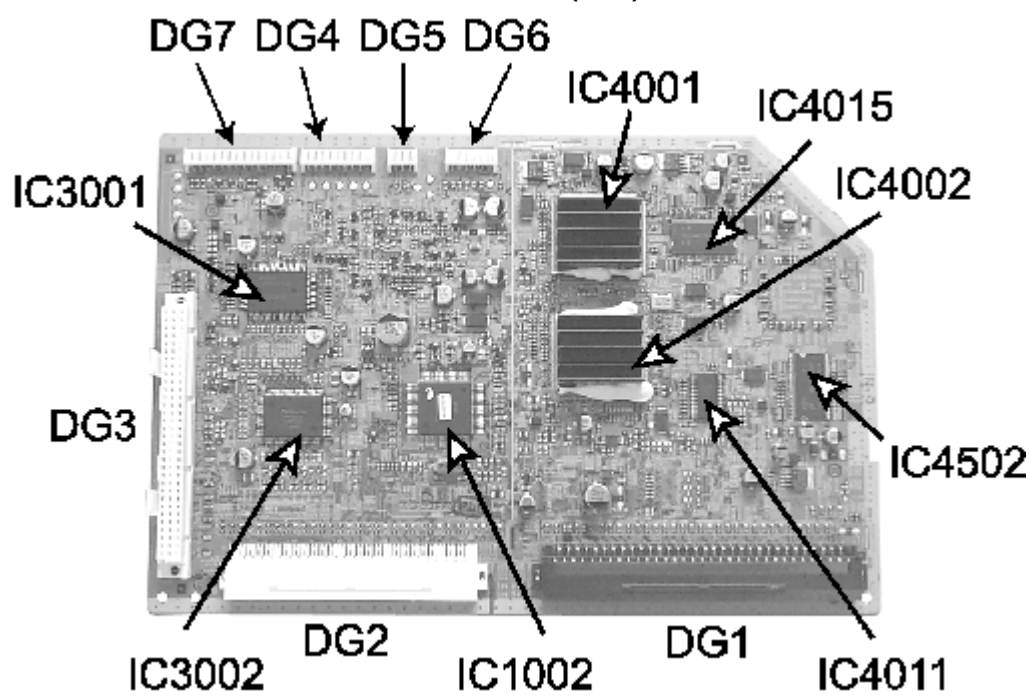
**SD CARD  
SLOT**

**PC CARD  
SLOT**

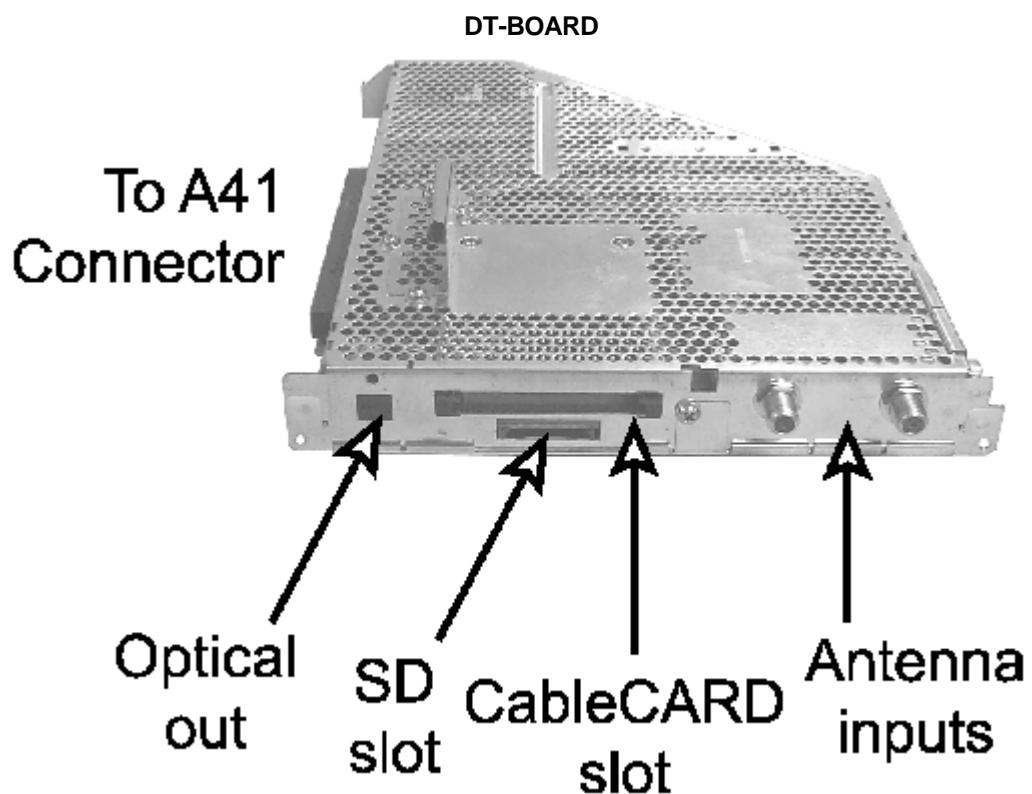
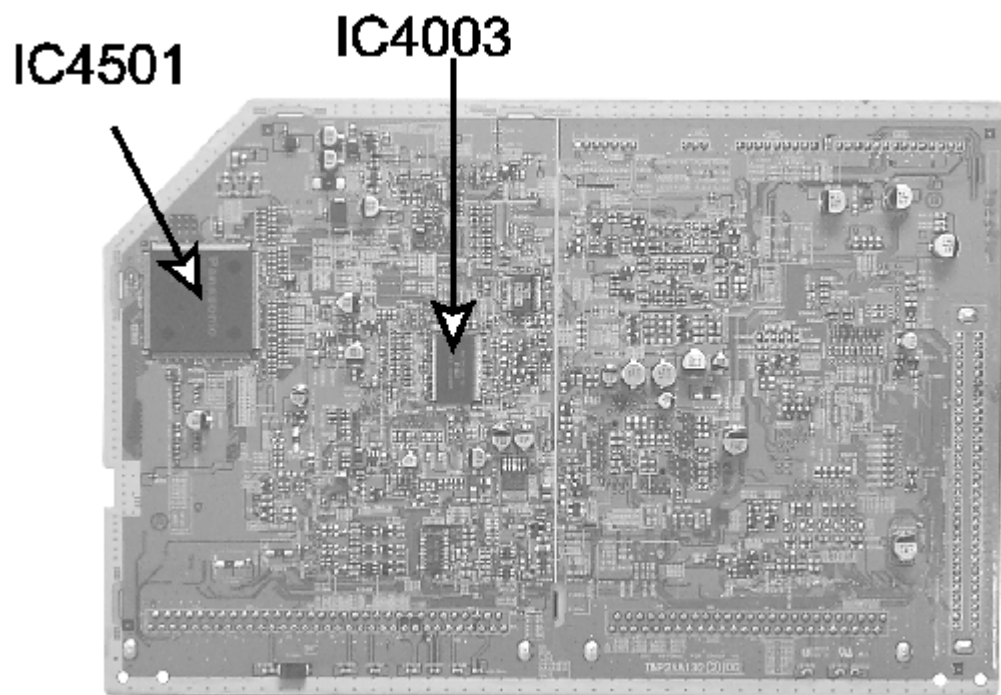
**T-BOARD**



DG-BOARD (TOP)



DG-BOARD (BOTTOM)



### 13. Disassembly for service

**NOTE:**

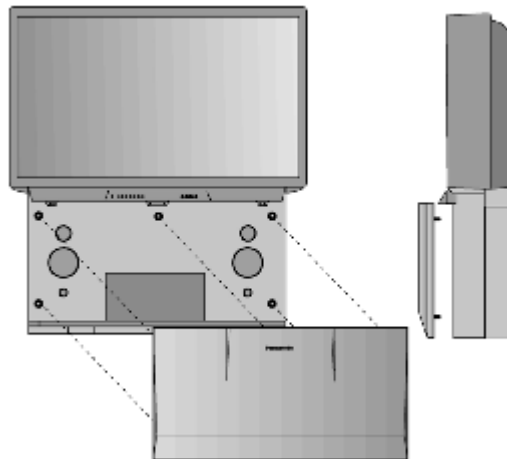
Board ground wires may have to be disconnected to disassemble some boards. All ground wires must be reconnected using jumper leads, if necessary, before power is applied to PTV for

service.

#### **Speaker grille removal**

Speaker grille, is secured to the cabinet of the PTV with 5 grommet holders. Grip panel from the sides and middle upper part, and gently pull forward to remove. When reassembling, make certain to firmly press on the panel where the insertion points(5) are located, one at each corner and one at the middle top edge.

#### **Speaker grille removal**



#### **Keyboard, JPEG viewer and front A/V inputs removal**

- 1. Remove the speaker grille.**
- 2. Unplug the connectors from the keyboard and front A/V inputs assemblies. Remove the screws (3) affixing the keyboard and front A/V inputs to the control panel and tilt the front panel assembly upward and release it from the front cabinet carefully and disconnect the JPEG viewer connector.**

#### **Speakers replacement**

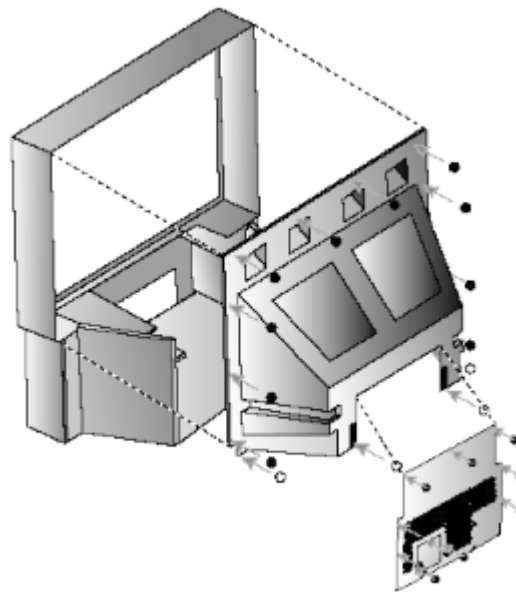
- 1. Remove the speaker grille.**
- 2. Each speaker is secured to the cabinet with 2 screws (Top speaker) and 4 screws (Bottom speaker).**
- 3. Disconnect the R and L speaker lead connectors from the speaker units.**



#### Back lower cover removal

1. Remove (7) hex screws around the perimeter, marked with arrows. See figure for screws location.
2. Remove (9) screws from around the A/V terminal board (marked with arrows).

#### Back lower cabinet removal



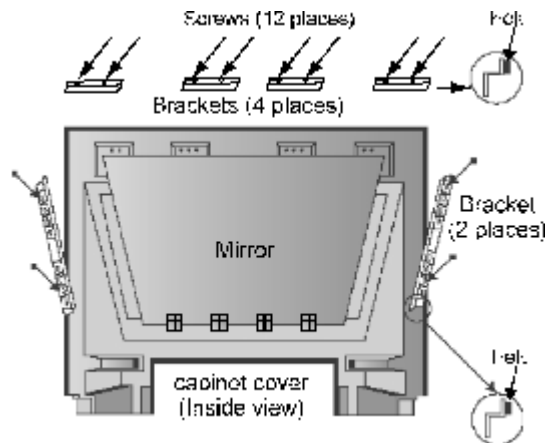
#### Back cabinet removal

1. Remove the back lower cover. (Detailed previously).
2. The top back cover (plastic shell) is secured with (14) screws around its perimeter. See figure for screws location.
3. Be careful not to damage the mirror secured to the underside of the back cover.

#### Mirror removal

The mirror is attached inside the cabinet cover. Carefully remove the cabinet cover to access its interior surface and remove the screws securing the brackets that hold the mirror at the top and sides to the mirror.

#### Mirror removal



#### Screen frame removal

1. Remove the speaker grille. Disconnect the cables leading to the keyboard, JPEG viewer and the A/V panels and remove the keyboard and AV panel assembly. The assembly is secured by three (3) screws.
2. At this point the front cover is held only by four screws, be careful not to push the cabinet forward.
3. Remove screws and tilt the assembly forward while lifting it out of place.

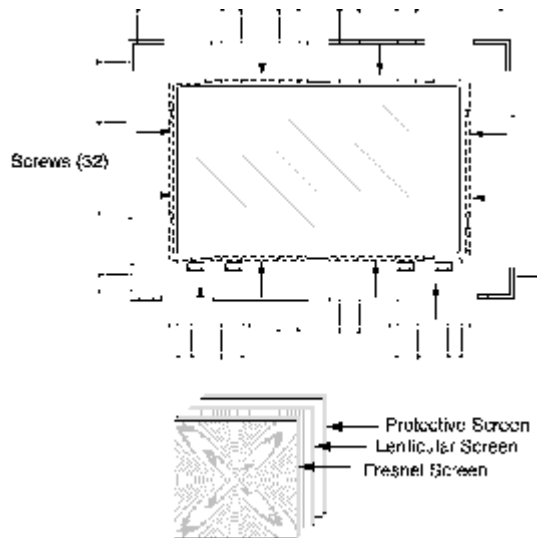
#### Screen assembly

1. Remove the screen frame. See screen frame removal procedure above.
2. Place screen frame face down on a soft surface.
3. Remove all screen brackets and corner brackets

#### Note:

The brackets are painted black (permanent marker) on the edge to prevent reflection on image.

#### Screen assembly



4. Remove the horizontal barrier panel at the back of the cabinet.
5. Unplug cables connectors (K1, JG3, G1 and speaker connectors) and pull out the main chassis block.

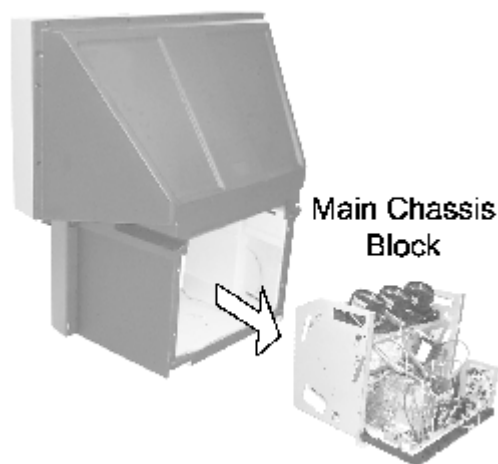
**Note:**

Main chassis block can be serviced either in normal position or laying on its back (protect hookup terminal from damage).

**Main chassis block**

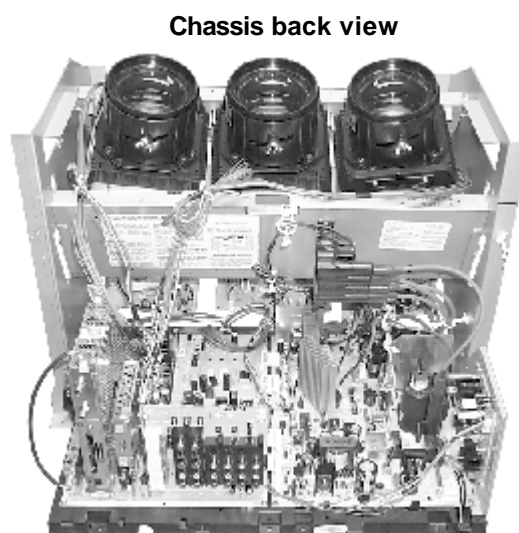
1. Remove the speaker grille.
2. Remove the back lower cabinet cover.
3. The main chassis block is secured to the cabinet by 2 screws at front, behind the Speaker Grill and 3 screws inside on the bottom of the optical frame).
4. Remove the horizontal barrier panel at the back of the cabinet.
5. Unplug cables (K1, G1, JG3 and speaker connectors) and pull out the main chassis block.

**Chassis removal**



### 13.1. Chassis assembly

The chassis assembly shown in figure includes all the electrical and optical (light box) components



#### A/V BACK COVER ASSEMBLY

This assembly is secured to H-Board by 8 screws. Be sure to disconnect the fan cable from H-board.

#### H-Board

1. H-Board is connected to DG-board with H1 connector.
2. Pull carefully to the right to disconnect.

#### DT-Board

1. This board has a metal frame holder that is fastened to A-Board with 2 screws. This metal frame must be removed first before trying pulling up DT-board, otherwise it can be damaged.
2. This board has grommet squares, be careful to do not screw too tight, otherwise the grommet screw hole will get stripped.
3. After removing the metal frame pull up carefully from A41 connector in A-Board.

**NOTE:**

This board is non-serviceable. Except for JK8002 and JK8003. / When removing this board pull carefully.

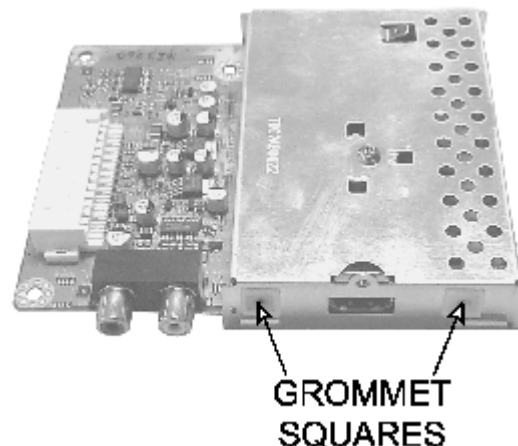
**DV-Board**

1. Plugs onto A-Board at the A51 connector.

**NOTE:**

This board is non-serviceable. / When removing this board pull carefully.

2. This board has two Grommet squares, be careful to do not screw too tight, otherwise this grommet screw hole will get stripped.



**NOTE:**

This board is non-serviceable. Except for JK5002 (ANALOG AUDIO JACKS) and JK5001 (DV1 connector) / When removing this board pull carefully.

#### **DG-Board**

- 1. Plugs onto A-Board at A31 and A32 connectors (DG1 and DG2 respectively).**
- 2. Remove plug cables from connectors DG4, DG5, DG6 and DG7.**

#### **NOTE:**

**This board is non-serviceable. / When removing this board pull carefully.**

#### **A-Board**

- 1. A-Board is secured to the chassis tray with six screws.**
- 2. The A-Board is mated to D-Board by four flexible connectors (male side of connectors): A1, A2, A3 & A4. To remove this board, unplug the connectors of A-Board pulling from the sides of each connector.**

#### **NOTE:**

**Some tie wraps that secure the wire dressings may need to be unfastened for chassis removal.**

- 3. Remove plug connector in A30 that goes to T-Board (T2).**
- 4. Remove plug connector in A15 that goes to LG-Board (LG1).**

#### **T-Board**

- 1. T-Board is secured to a metal frame by 4 screws. This metal frame is fastened with 2 screws in D-Board and with 1 screw from the main chassis metal frame.**
- 2. Disconnect T2 connector that goes to A-Board (A30).**
- 3. Disconnect T1 plug connector that goes to D-Board (D10).**

#### **NOTE:**

**Some tie-wraps that secure the wire dressings may need to be unfastened for chassis removal.**

#### **D-Board**

- 1. D-Board is secured to the chassis tray with five screws.**
- 2. The D-Board is mated to the A-Board by four connectors (female side of connectors): D1, D2, D3 & D4. To remove this board, unplug the connectors on the A-Board pulling from the sides of each connector.**

#### **NOTE:**

Some tie-wraps that secure the wire dressings may need to be unfastened for chassis removal.

#### **DC-Board**

- 1. Plugs onto the D-Board at the D21, D22 and D23 (DC1, DC2 and DC3 respectively) connectors.**

#### **NOTE:**

This board is non-serviceable. / When removing this board pull carefully.

#### **JG-Board**

- 1. This board is fastened by 4 screws to the front panel.**

#### **NOTE:**

This board is non-serviceable except for the JG1 and JG2 connectors. / Remove this board carefully.

#### **R-Board**

- 1. This board is secured to the upper front side of the light box by one screw, and plugged to R1 connector from DG5 on DG-Board.**

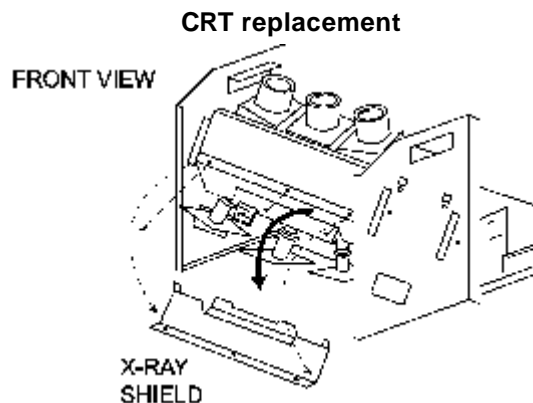
LR, LG and LB Board

1. Each board is plugged into the socket on the PRT neck, LR-Board on red PRT, LG-Board on green PRT and LB-Board on blue PRT.

### 13.2. Disassembly for CRT replacement

To facilitate CRT replacement, the complete CRT mounting chassis does not need to be removed.

1. Remove the main chassis block from the cabinet.
2. Remove the optical bracket metal cover (front side x-ray shield) by removing 3 screws on top.



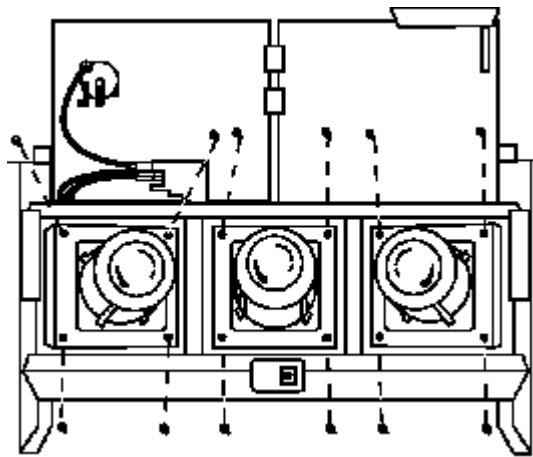
3. Remove the defective CRT anode lead from the high voltage distributor block that is mounted on the flyback transformer. Discharge to CRT chassis.
4. Unplug connectors from D-Board. See board layout. D14 for red, D15 for green and D16 for blue
5. Unplug the defective CRT black DAG ground connector from the CRT Board.
6. Remove the CRT Board from the defective CRT neck.
7. Remove (4) screws from the defective CRT housing.

**Caution:**

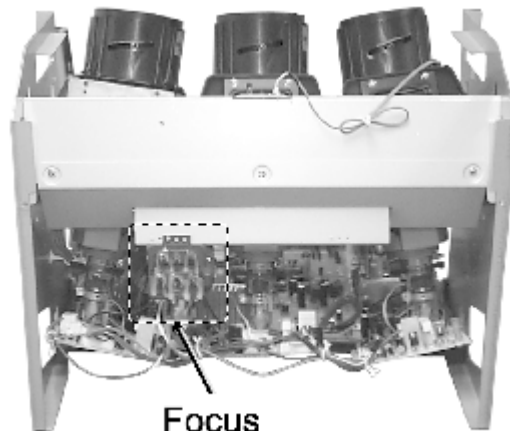
Do not remove the (4) CRT lens screws. Support the CRT assembly when loosening screws.

CRT replacement





Focus pack location



Focus  
Pack

8. Release CRT anode lead from CRT chassis wire clamp and all other wires from holders.
9. Loosen a screw that secures the DY and remove it from the CRT neck.

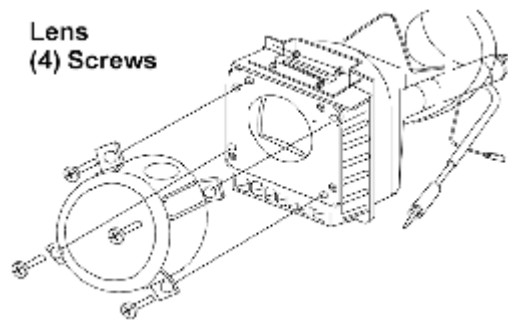
**Caution:**

To insure protection against x-ray radiation, the lens must be mounted in place at all times when power is applied to the PTV

**CRT replacement**

1. Remove CRT focus lens assembly (4 screws)

CRT assembly



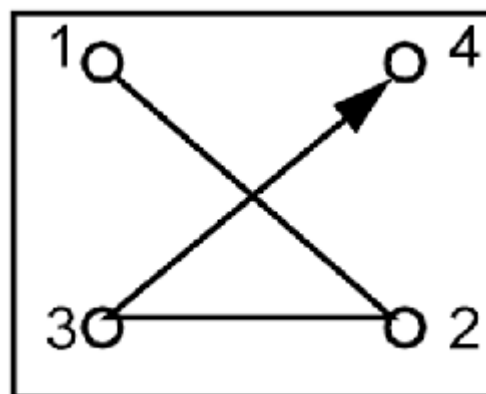
2. Lay CRT face down on a soft cloth.
3. Note position of yoke with centering tabs and remove from defective CRT.
4. Remove CRT DAG ground from defective CRT. Mount it on the replacement CRT exactly as it was on the defective CRT.

**Note:**

Replacement CRT is supplied with H.V. anode lead attached.

5. Wire the anode lead wire.
6. Install yoke with other CRT neck assemblies on CRT neck in the same order and position as removed from the defective CRT.
7. Press yoke against bell of CRT and tighten the clamp just snug enough so it will not easily shift.
8. Assemble CRT focus lens assembly to new CRT with (4) screws. Make sure focus lens adjustment nut is in the same location as on other CRT focus lens

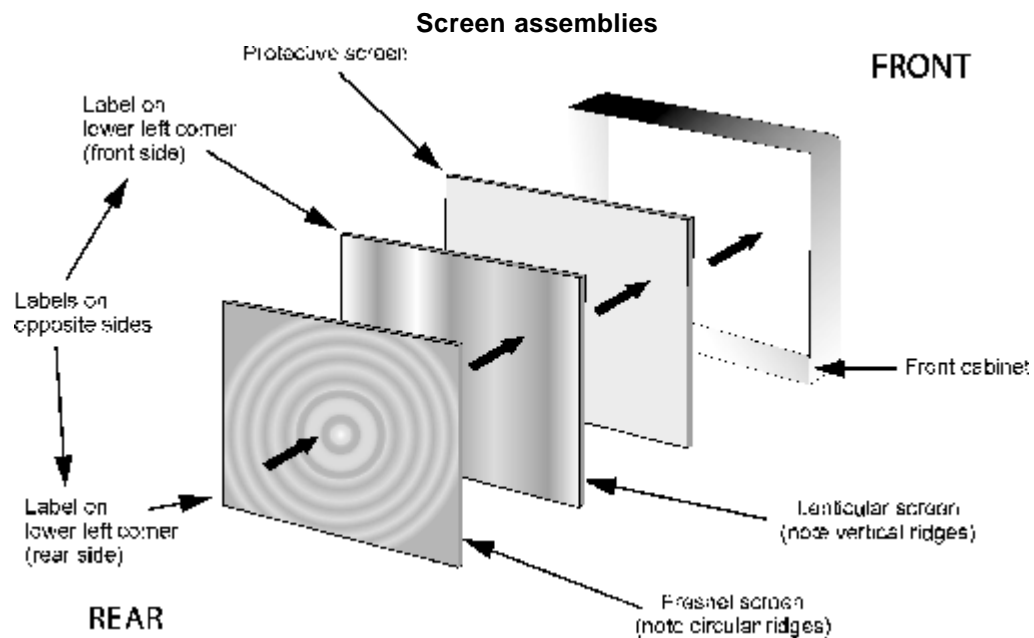
CRT screw tightening order



**Note:**

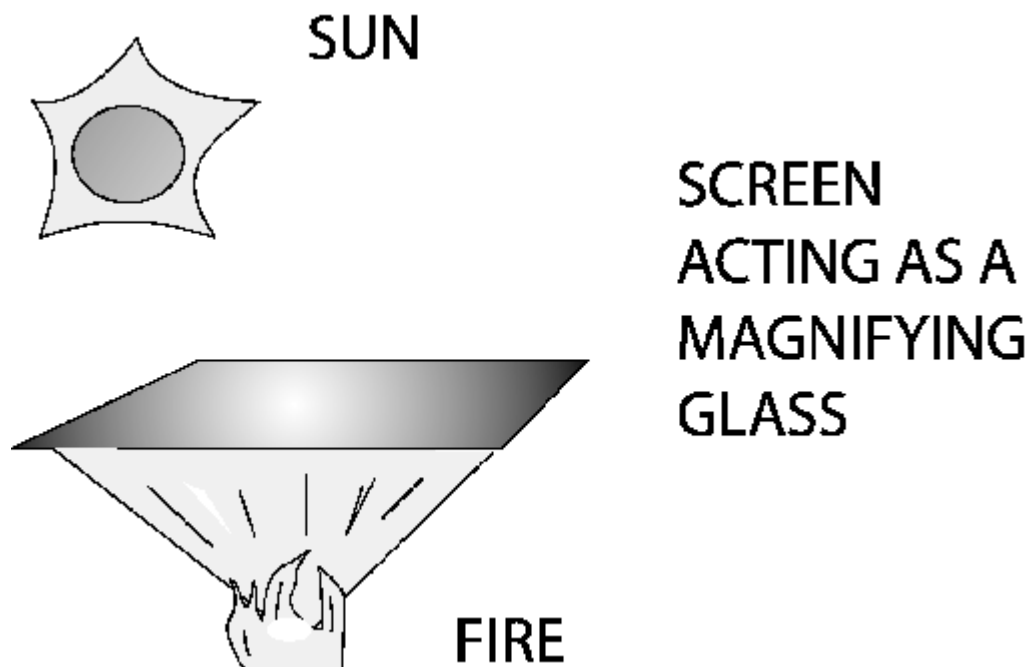
Please assemble with screws in the order shown and tighten with the same torque.

### 13.3. PTV screen assemblies



### 13.4. Screen assemblies warning

When storing or disposing of screen assemblies, be sure not to place them in direct sunlight. These screens may act as a magnifying glass and could cause a fire.



## 14. B + voltages table

Preparation:

Set the following controls

- Picture to Normal
- Bright to Normal
- Volume to MIN (0)

Procedure:

1. Apply a NTSC COLOR BAR pattern
2. Connect the negative lead of the digital voltmeter to TPGND1 (cold ground).
3. Connect the positive lead of the digital voltmeter to each test point and confirm the B+ voltages.

No.	D-Board Test point	Voltage
1	C830 (+)	138.6±1.0
2	TPD13	19.0±1.5
3	TPD12	19.0±1.5
4	TPD11	-19.5±1.5
5	TPD10	22.0±1.5
6	C845 (-)	-22.5±1.5
No.	A-Board Test points	Voltage
1	TP118	5.0±0.5
2	TP114	2.5±0.5
3	TP070	5.0±0.5
4	L893	9.0±0.5
5	TP137	30.0±0.5

## 15. Service Mode (electronic controls)

This receiver has electronic technology using the IC bus concept. It performs as a control function and it replaces many mechanical controls. Instead of adjusting mechanical controls individually, many of the control functions are now performed by using “on screen display menu”. (The service adjustment mode.)

### NOTE:

It is suggested that the technician reads all the way through and understand the following procedure for entering/exiting the service adjustment mode; then proceed with the instructions working with the receiver. When becoming familiar with the procedure, the flow chart for service mode may be used as a quick guide.

### 15.1. Quick entry to service mode:

When minor adjustments need to be done to the electronic controls, the method for entering the service mode without removal of the cabinet back is as follows, using the remote control:

1. Select SET-UP icon, enter “Program CH” and select CABLE mode in “Input Setup” option.

2. Select **TIMER** icon and set **SLEEP** time for 30 Min.
3. Press **“OK”** then **VOL** up to exit menus.
4. Tune to the Channel 124.
5. Adjust **VOLUME** to minimum (0).
6. Press **VOL** ← (decrease) on receiver. Red **“CHK”** appears in upper corner.

To toggle between aging and service modes:

While the **“CHK”** is displayed on the left top corner of the CRT, pressing **“OK”** and **“VOL”** UP on the TV simultaneously will toggle between the modes. Red **“CHK”** for service mode and yellow **“CHK”** for aging.

7. Press **POWER** on the remote control to display the service adjustment modes menu, select adjustment by pressing the **VOL** right/left buttons and **CH** up/down buttons on the remote and **OK** to enter the adjustment.

**Service mode menu**

	480I	480P	1080I	
<b>MODE</b>	DW	ZOOM		
	ID:00			
<b>CLOCK</b>	CLOCK	SD_DL	I-P	
<b>VIDEO</b>	COLOR	B-Y_G	TINT	R-Y_A
	BRIGH	CONT	CUT R	CUT B
	R DR	B DR	I-ABL	C-OFF
<b>HDEF</b>	H POS	H WID	PCC	TRAP
	BTMG	TOPG	H-EHT	
<b>VDEF</b>	V-AMP	V-C	V-S	V-EHT
	EHTFB			
<b>CONV</b>	MUTE	COARS	FINE	
<b>DAF</b>	H-PAR	V-SAW	V-PAR	
<b>OTHER</b>	ACL	HHS	JPEG	
<b>ID</b>	ID			
<b>EFP</b>	AREA	IN>EX	EX>IN	

## 15.2. Exiting the service mode:

This PTV goes out from service mode when it is unplugged or turned OFF. To exit the service mode, turn the TV OFF or unplug the PTV from AC.

### Other method

Press **OK** and **POWER** on the receiver simultaneously for at least 2 seconds. The receiver momentarily performs a self-check, tuned in channel 3 with a preset level of sound. To completely make an entire reset of the PTV unplug AC cord from AC outlet and plug it back in, then turn PTV power ON. Any programmed channels, channels caption data and some others user defined settings will be erased when performing this reset.

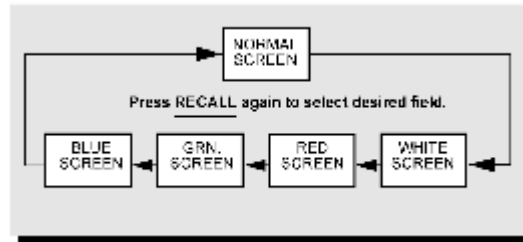
### IMPORTANT NOTE

Always check that PTV exits the service mode

To check colors:

Press RECALL on the remote control when in service mode (red “CHK” is displayed) to enter the purity field check mode.

Color check



### 15.3. Service adjustment default values for items

DESCRIPTION	REGISTER	FORMAT				
		NTSC (480i)	480i ZOOM	480P	480P ZOOM	
CLOCK ADJ	CLOCK	124	N/A	N/A	N/A	
FIRMWARE DOWNLOAD	SD_DL	00	00	00	00	
INTERLACED TO PROGRESSIVE	I-P	00	N/A	00	00	
COLOR	COLOR	20	N/A	N/A	N/A	
MAGENTA TINT ADJ	B-Y_G	2B	N/A	N/A	N/A	
TINT	TINT	85	N/A	N/A	N/A	
YELLOW TINT ADJ	R-Y_A	96	N/A	N/A	N/A	
SUB-BRIGHTNESS	BRIGH	09 F8	N/A	N/A	N/A	(
SUB-CONTRAST	CONT	02 9F	N/A	N/A	N/A	(
RED CUT-OFF	CUT R	01 F5	N/A	N/A	N/A	(
BLUE CUT-OFF	CUT B	02 23	N/A	N/A	N/A	(
RED DRIVE	R DR	64	N/A	N/A	N/A	
BLUE DRIVE	B DR	42	N/A	N/A	N/A	
INDIVIDUAL ABL CHECK	I-ABL	VARIABLE	N/A	VARIABLE	N/A	VA
CUT OFF ADJ	C_OFF	00	00	00	N/A	
HORIZONTAL POSITIONING	H POS	01 83	01 83	01 83	N/A	(
HORIZONTAL WIDTH	H WID	51	51	51	N/A	
PINCUSHION CORRECTION	PCC	40	40	40	N/A	
TRAPEZOID	TRAP	81	81	81	N/A	
BOTTOM CORNER PINCUSHION	BTMG	B0	B0	B0	N/A	
TOP CORNER PINCUSHION	TOPG	B4	B4	B4	N/A	
HORIZONTAL EHT PRESET	H-EHT	N/A	N/A	N/A	N/A	
VERTICAL SIZE	V-AMP	00 94	00 94	00 94	N/A	(
VERTICAL LINEARITY	V-C	87	87	87	N/A	

DESCRIPTION	REGISTER	FORMAT				
		NTSC (480i)	480i ZOOM	480P	480P ZOOM	
VERTICAL S CORRECTION	V-S	59	59	59	N/A	
VERTICAL EHT PRESET	V-EHT	N/A	N/A	N/A	N/A	
FLYBACK EHT PRESET	EHTFB	FF	FF	FF	N/A	
MUTE CONVERGENCE	MUTE	00	00	00	N/A	
COARSE ADJ	COARS	00	00	00	N/A	
FINE ADJ	FINE	00	00	00	N/A	
H DAF ADJUSTMENT	H-PAR	0	0	0	N/A	
V SAW DAF ADJUSTMENT	V-SAW	0	0	0	N/A	
V DAF ADJUSTMENT	V-PAR	0	0	0	N/A	
ACL ADJUSTMENT	ACL	00	00	0	N/A	
JPEG SERVICE MENU	JPEG	00	00	0	N/A	
ID*	ID	00	00	00	00	
AREA	AREA	FIX	FIX	FIX	N/A	

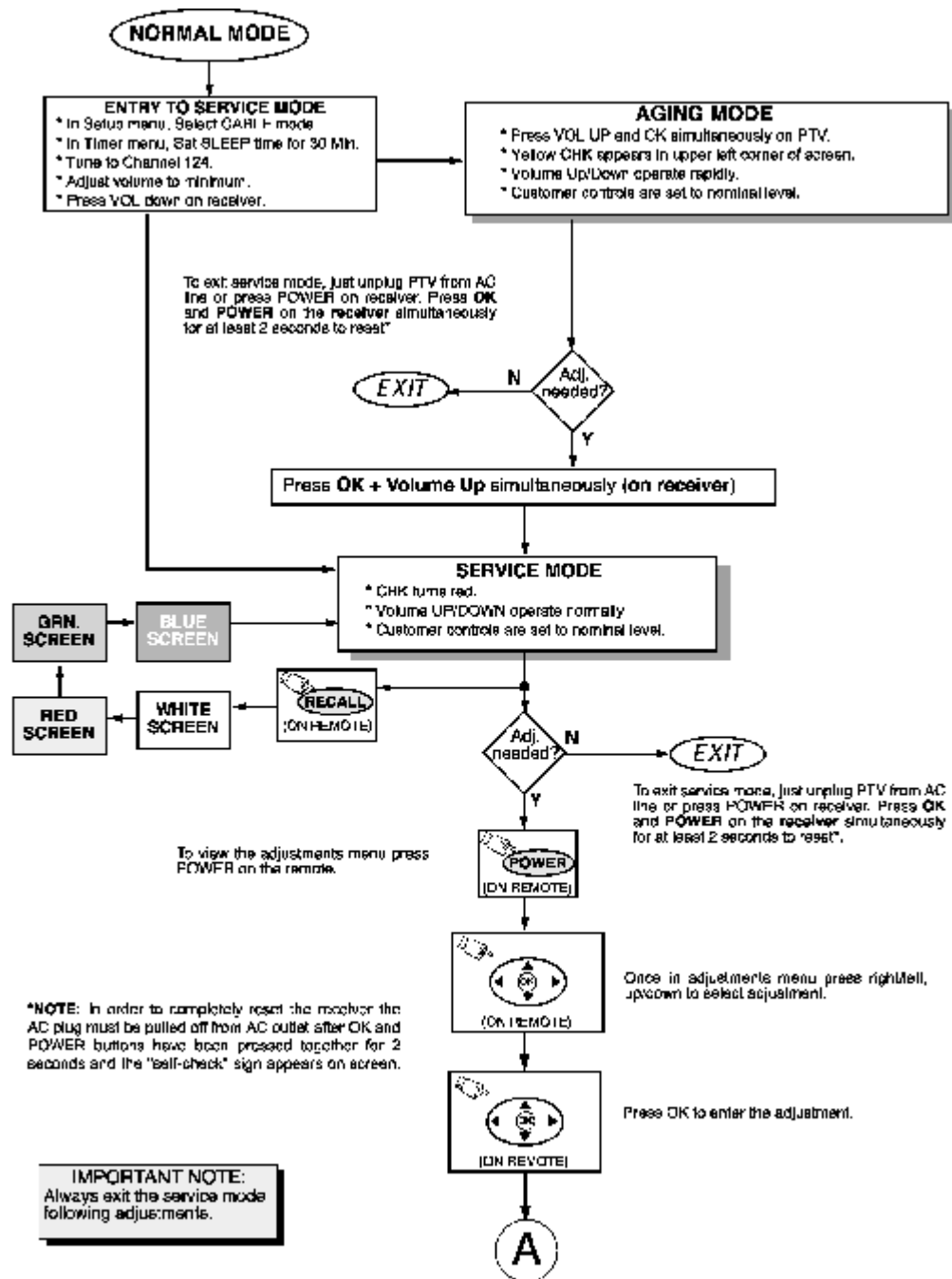
**\*IMPORTANT:**

The default ID register value should not be modified in any way, it has been already set to a factory default value specifically for the models listed in this manual.

**NOTE:**

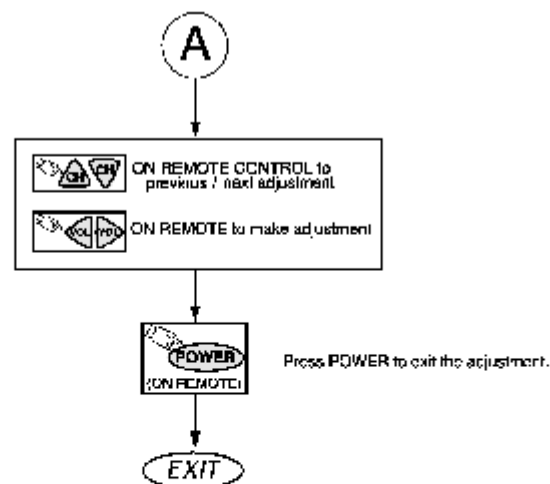
The above table shows the default values for the service items, this values can change depending on the serviced PTV.

## 15.4. Instructional flow for service mode



## 15.5. Instructional flow for service mode (continued...)





Press POWER to exit DAC's MENU then press OK and POWER buttons on the PTV simultaneously for at least 2 seconds to exit service mode and reset.

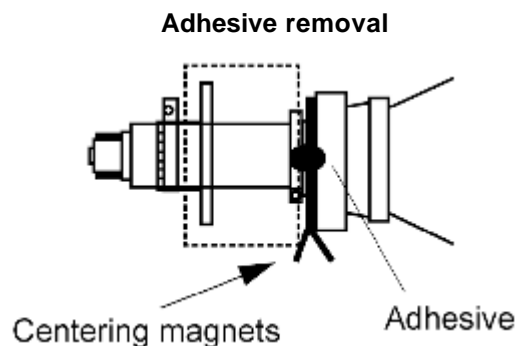
**\*NOTE:** In order to completely reset the receiver the AC plug must be pulled off from AC outlet after OK and POWER buttons have been pressed together for 2 seconds and the "self-check" sign appears on screen.

## 16. CRT Set Up

### CAUTION:

Insure that yoke plugs are reconnected on D-Board before turning the PTV ON to prevent damage to the horizontal output transistor and /or CRTs.

1. Connect test generator to the antenna terminal and set for a monoscope pattern.
2. Loosen yoke clamp, seat yoke against bell of CRT and rotate to correct yoke tilt (compare to adjacent CRT). Tighten yoke clamp.
3. Remove adhesive from centering tabs and set centering tabs for zero correction.



4. Cover replacement CRT lens and static converge the tubes not

replaced, if needed. Check size and linearity of pattern and adjust as required

5. Uncover replacement CRT lens and cover other two CRT lenses. Adjust electrical and optical focus (lens), if required.
6. Uncover all CRT lenses and use yoke centering magnet to converge replacement CRT (in center area of screen only) with other two CRTs. Disregard of convergence in areas other than center area.
7. Perform white balance adjustments.

### **16.1. Dynamic focus adjustments**

1. Focus adjustments should be performed after 1 hour of aging.
2. Use oscilloscope with 100 : 1 probe.
3. Apply a NTSC crosshatch pattern to adjust focus.
4. Adjust the red, blue and green focus VR on the focus block for best focus of overall picture of each CRT.
5. To change DAF DATA, enter to service mode, then press POWER on remote to display DACs menu, then select DAC by pressing CH (RIGHT/LEFT) and VOL (UP/DOWN), then press OK to enter to DAC, then adjust by pressing VOL (RIGHT/LEFT); press OK, to save press OK again or OTHER key to exit without saving.

Procedure:

NOTE:

1080i, 480p, 480i pattern can be obtained from Panasonic's TU-DST51 set top box DTV decoder.

### **1. Enter to service mode and set the following default DATA**

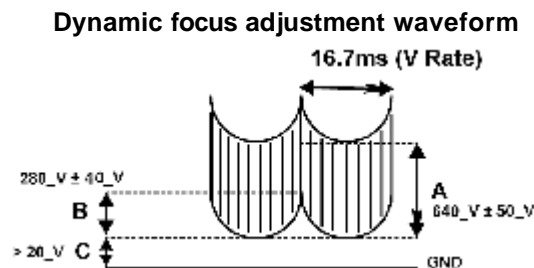
H-PAR	+247
V-SAW	+1
V-PAR	+15

NOTE:

The signal (NTSC, 1080i and NTSC in ZOOM option), should be applied and displayed to enter values for specific format adjustment.

### **2. For 1080i set the default values.**

3. For NTSC and NTSC ZOOM apply a white pattern and perform the following steps.
4. Connect the scope probe to D30, GND to Q551 heat sink.
5. Confirm that level of A is  $640 \pm 50\text{V}$ , adjust / “H-PAR” DAC to set to specification level.
6. Confirm that the voltage level in D30 is similar between point E and F, if not, adjust V-SAW DAC.
7. Confirm that level of B is  $280 \pm 40\text{ V}$ , adjust / “V-PAR” DAC to set to specification level.
8. Confirm that level of C is more than  $20\text{ V}$ , adjust / “H-PAR” DAC to set to specification level.



## 16.2. Focus - Electrical & optical adjustments

(use for minor adjustment or for final adjustment, for complete adjustment see following section.)

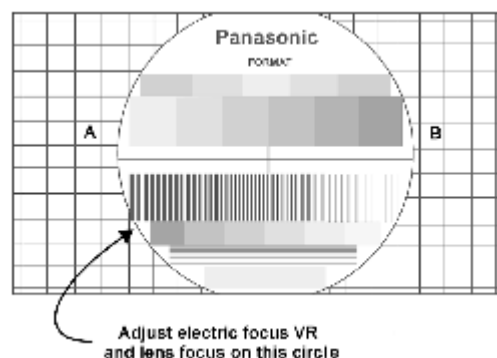
### Electrical Adjustment

#### NOTE:

1080i, 480p, 480i pattern can be obtained from Panasonic's TU-DST51 set-top box DTV decoder.

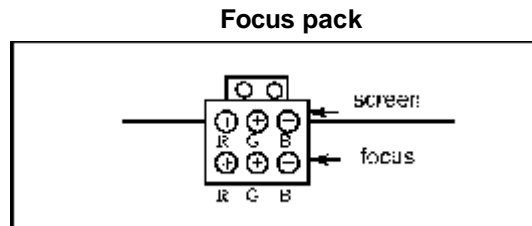
### 1. Apply a crosshatch with dots pattern

#### Lens focus adjustment



	RED	GREEN	BLUE
Electric focus	B	A/B	A
Optical Focus	B	A/B	A

- Set VIDEO "C\_OFF" DAC from 00 to 02, and project only red. Adjust red focus VR so that focus is best



- Adjust red lens focus (mechanical) until focus is best.
- Adjust red focus VR again.
- Set VIDEO "C\_OFF" DAC from 00 to 01, and project only green.
- Repeat steps for green only.
- Set VIDEO "C\_OFF" DAC from 00 to 03, and project only blue.
- Repeat steps for blue only.

### 16.2.1. Focus - Optical lens adjustment

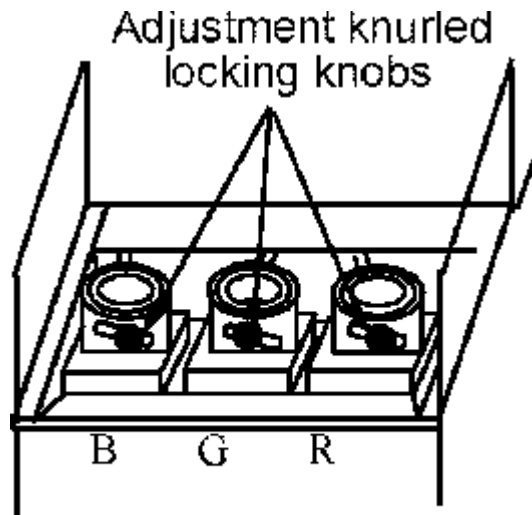
#### Optical adjustments

##### NOTE:

This adjustment normally should not require resetting unless the lenses have been replaced or adjustment has changed.

- Optical focus adjustment is located on the top of each CRT lens system. Loosen the adjustment knurled locking knob.

Optical lens focus adjustment



## REAR VIEW

2. Turn the PTV ON. Apply and view a crosshatch with dots pattern.
3. Adjust each lens focus for best focus while viewing each CRT.
4. Cover the red and blue CRT, projecting green only. Rotate the green lens for best focus around screen center area.
5. Do the same for the red focus lens while projecting red only.
6. Repeat for blue.
7. Align VM coils.

## 17. Electronic Adjustments

### 17.1. Horizontal phase adjustment (H POS)

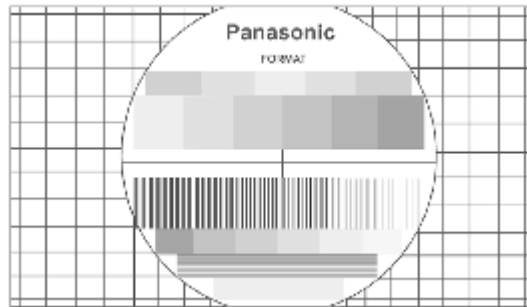
This adjustment is intended to correct the horizontal position of the picture

#### NOTE:

1080i, 480p, 480i pattern can be obtained from Panasonic's TU-DST51 set-top box DTV decoder.

1. Apply a pattern that lets adjust the image to correct vertical size (see above note).
2. Set VIDEO "C\_OFF" DAC from 00 to 01 (to project only green).
3. Set DAC MUTE from 00 to 01 (disabling digital convergence).
4. Turn green deflection yoke until line is perfectly horizontal.
5. Adjust "H POS" DAC data so that pattern is in the center of screen.

6. Enable digital convergence by changing DAC MUTE from 01 to 00.
7. Set VIDEO "C\_OFF" DAC from 01 to 00



## 17.2. Centering magnets adjustment

### NOTE:

1080i, 480p, 480i pattern can be obtained from Panasonic's TU-DST51 set-top box DTV decoder.

### Procedures:

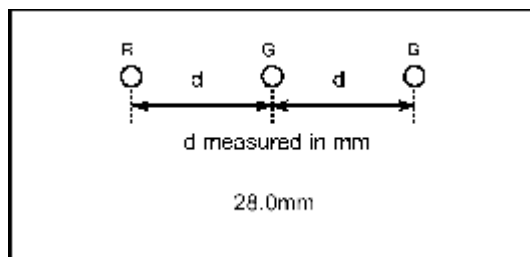
1. Apply a crosshatch pattern with dots.
2. Set VIDEO "C\_OFF" DAC from 00 to 01 to project only green.
3. Set DAC MUTE from 00 to 01 (disabling digital convergence).
4. Loose the deflection coil screw on the green CRT.
5. Adjust green deflection coil until the horizontal center line is horizontal.
6. Adjust centering magnets until the green pattern is equal on left and right. Adjust also for horizontal and vertical tilt.

### NOTE:

Push deflection coil to top of CRT neck, then tighten deflection screw after adjusting each CRT centering and tilt.

7. Set VIDEO "C\_OFF" DAC from 01 to 03 to project only blue. Adjust deflection coil until the horizontal center line matches the pattern of the grid and is leveled.
8. Adjust blue centering magnets until the pattern center is at the appropriate distance as indicated on the following figure.

Centering magnets adjustment



9. Set VIDEO “C\_OFF” DAC from 01 to 02 to project only red.
10. Adjust red deflection coil until the horizontal center line matches the pattern of the grid and is leveled.
11. Adjust red centering magnets until the pattern center is at the appropriate distance as indicated on figure.
12. Enable digital convergence by changing DAC MUTE from 01 to 00.
13. Set VIDEO “C\_OFF” DAC from 02 to 00. Following the adjustment, make sure that all deflection coils are pushed completely toward the CRT cones and that all screws are tightened.

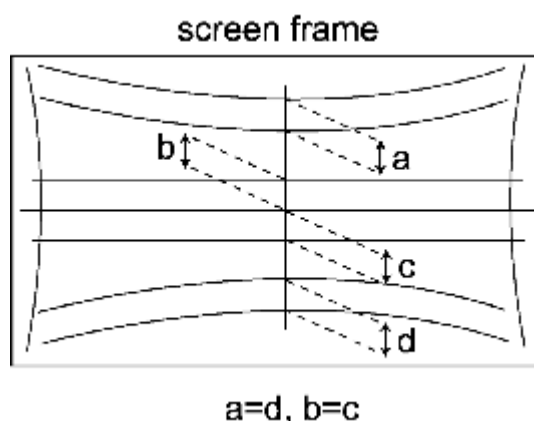
### 17.3. Vertical linearity adjustment (V-C and V-S)

This adjustment is intended to make the picture vertically proportional (top, center and bottom)

#### NOTE:

1080i, 480p, 480i pattern can be obtained from Panasonic’s TU-DST51 set-top box DTV decoder.

1. Apply a pattern that lets adjust the image to correct vertical linearity (see above note).
2. Set VIDEO “C\_OFF” DAC from 00 to 01 (to project only green).
3. Set DAC MUTE from 00 to 01 (disabling digital convergence).
4. Adjust centering magnets so that the center of the pattern get aligned with screen frame center.
5. Adjust VDEF “V-C” and “V-S” DAC until vertical size is proportional on top and bottom. Confirm to correct linearity in the middle of the screen.
6. Set DAC MUTE from 01 to 00 (disabling digital convergence).
7. Set VIDEO “C\_OFF” DAC from 01 to 00



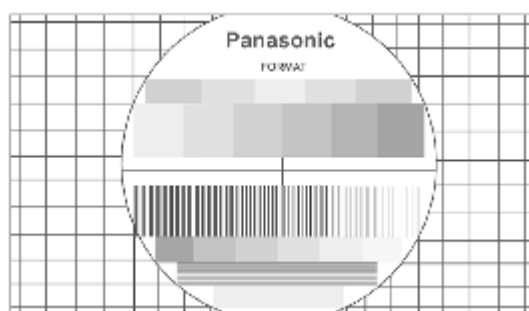
### 17.4. Vertical size adjustment (V-AMP)

This adjustment is intended to correct the vertical size of the picture.

**NOTE:**

1080i, 480p, 480i pattern can be obtained from Panasonic's TU-DST51 set-top box DTV decoder.

1. Apply a pattern that lets adjust the image to correct vertical size (see above note).
2. Set VIDEO "C\_OFF" DAC from 00 to 01 (to project only green).
3. Set DAC MUTE from 00 to 01 (disabling digital convergence).
4. Adjust centering magnets so that the center of the pattern get aligned with screen frame center.
5. Adjust VDEF "V-AMP" DAC until vertical size is proportional on top and bottom.
6. Set DAC MUTE from 01 to 00 (disabling digital convergence).
7. Set VIDEO "C\_OFF" DAC from 01 to 00



### 17.5. Horizontal size adjustment / (H\_POS)

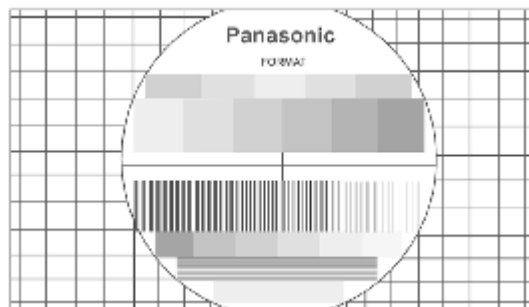
This adjustment is intended to correct the horizontal position of the picture.

**NOTE:**

1080i, 480p, 480i pattern can be obtained from Panasonic's TU-DST51 set-top box DTV decoder.



1. Apply a pattern that lets adjust the image to correct horizontal position (see above note)
2. Set VIDEO “C\_OFF” DAC from 00 to 01 to project only green.
3. Set DAC “MUTE” from 00 to 01 (disabling digital convergence).
4. Turn green deflection yoke until line is perfectly horizontal.
5. Adjust “H WID” DAC data so that pattern has the correct horizontal size.



6. Set DAC MUTE from 00 to 01 (disabling digital convergence).
7. Set VIDEO “C\_OFF” DAC from 01 to 00.

### 17.6. Pincushion adjustment (PCC)

This adjustment is intended to correct curved sides of the picture.

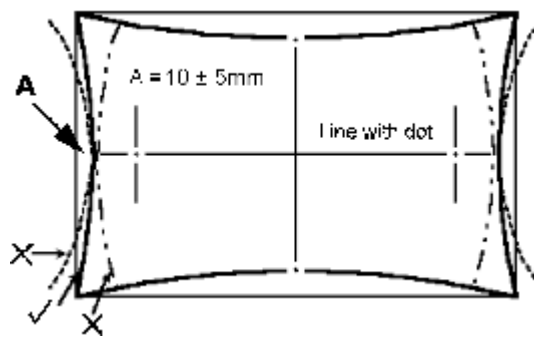
#### NOTE:

1080i, 480p, 480i pattern can be obtained from Panasonic’s TU-DST51 set-top box DTV decoder.

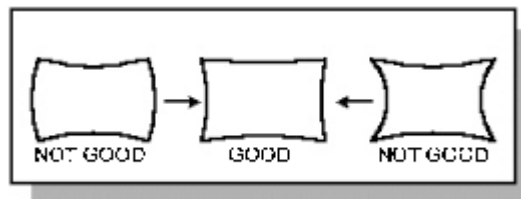
#### Procedure:

1. Apply a pattern that lets adjust the image to correct curved sides (see above note)
2. Set VIDEO “C\_OFF” DAC from 00 to 01 to project only green.
3. Set DAC “MUTE” from 00 to 01 (disabling digital convergence)
4. If the distance at “A” is not  $10 \pm 5\text{mm}$ , enter H DEF “H WID” DAC and adjust by VOLUME UP/DOWN until it is  $10 \pm 5\text{mm}$ .

Pincushion adjustment



Pincushion



5. If not all corners of cross hatch appear in screen, enter V DEF “V-AMP” DAC and adjust until they appear.
6. Confirm that measurement of “A” has not changed.
7. Enable digital convergence by changing DAC MUTE from 01 to 00.
8. Set VIDEO “C\_OFF” DAC from 01 to 00.

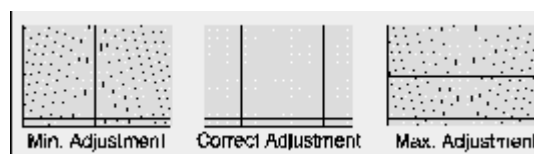
### 17.7. Trapezoid adjustment (TRAP)

**NOTE:**

1080i, 480p, 480i pattern can be obtained from Panasonic’s TU-DST51 set-top box DTV decoder.

**Procedure:**

1. Apply a crosshatch pattern.
2. Enter service mode, select “TRAP” and adjust DATA with VOLUME keys in remote so that lines at right and left are vertical like a solid line.



### 17.8. Horizontal size adjustment (H WID)

This adjustment is intended to adjust horizontal width of the picture.

**NOTE:**

1080i, 480p, 480i pattern can be obtained from Panasonic's TU-DST51 set-top box DTV decoder.

1. Apply a pattern that lets adjust the horizontal size.
2. Set VIDEO "C\_OFF" DAC from 00 to 01 to project only green.
3. Set DAC "MUTE" from 00 to 01 (disabling digital convergence).
4. In service mode, adjust "H WID" DAC until the picture horizontal size is balanced at left and right side of screen.
5. Set DAC "MUTE" from 01 to 00 (disabling digital convergence).
6. Set VIDEO "C\_OFF" DAC from 01 to 00.

### **17.9. Sub-Bright adjustment (BRIGH) and ABL check**

This adjustment is intended to set 7 IRE signal to black level mode.

Procedure:

1. Set PICTURE MODE TO VIVID, PICTURE settings to normal, NATURAL COLOR to OFF and COLOR TEMPERATURE to NORMAL.
2. Connect meter (positive lead) to D31 pin 2 and (negative lead) to D31 pin 1.
3. Apply a color bar with no color or if available a grey levels pattern.
4. Adjust DAC "BRIGH" data so that bar near to black bar becomes near black
5. Apply an HD 1080i signal and repeat this adjustment for HD 1080i mode
6. To check ABL apply a white pattern and put user bright control (BRIGHTNESS in Picture menu) control to max. and confirm that reading on meter is  $12.4 \pm 0.8V$ .

### **17.10. Individual ABL Check (I-ABL)**

Procedure:

1. In PICTURE menu set the picture to "NORMAL".
2. Apply a pure blue flat signal from a signal generator or another source.
3. In service mode select "I-ABL" DAC from service menu.
4. Confirm that the 3 hex values that appear on screen (below the "I-

ABL” label) are close to 0, i.e. “00 00 00”

5. If the “I-ABL” values differ too much from 0, repeat bright and ABL adjustment again.

### **17.11. Red, green & blue screen Cut-Off**

1. Use either a no input signal condition or raster from the NTSC generator.
2. Observing the green tube directly or via a reflective surface, adjust the VR on focus pack for the green tube for minimum noise.
3. Adjust the noise level in the red and blue tubes to match the noise level in the green tube.

### **17.12. White balance adjustment**

NOTE:

1080i, 480p, 480I pattern can be obtained from Panasonic’s TU-DST51 set-top box DTV decoder.

Prior to this adjustment, perform sub-contrast adjustment. This adjustment requires the service user skills in observing what a screen without color should look like (white picture).

Preparation:

1. Set the following in the user picture menu as follows:

- PIC MODE to VIVID
- COLOR to center (31)
- PICTURE to max (63)
- BRIGHT to center (31)
- SHARPNESS to min. (0)
- TINT to center (31)
- NATURAL COLOR to OFF
- COLOR TEMPERATURE to COOL

1. Enter the service mode.
2. Apply a black and white pattern to one of the video inputs (see above note) color bar with no color.

#### **17.12.1. High light white balance adjustment**

1. Adjust DAC R\_DR for red and B\_DR for blue adjustments.

2. Make sure the screen is not blue or green. The screen should be white in the white area.
3. Check the black and white area for a black and white picture with even shades of gray and no color tint in the picture.

#### 17.12.2. Low light white balance adjustment

1. Adjust DAC CUT\_R for red and DAC CUT\_B for blue.
2. Check the screen for even white in all areas, no color.
3. Check the black and white pattern for a black and white picture, even shades of gray and no color tint in the low light areas.
4. Repeat the high light and low light white balance again until the white balance tracks from high light to low light.

#### 17.13. Color adjustment (TINT, B-Y\_G, R-Y\_A)

##### NOTE:

1080i, 480p, 480i pattern can be obtained from Panasonic's TU-DST51 set-top box DTV decoder.

This adjustment requires that the servicer use the skills in observing what a colorbar pattern should look like.

##### Preparation:

1. Set the following in the user picture menu as follows:

- PIC MODE to VIVID
- COLOR to center (31)
- PICTURE to max (63)
- BRIGHT to center (31)
- SHARPNESS to min. (0)
- TINT to center (31)
- NATURAL COLOR to OFF
- COLOR TEMPERATURE to COOL

##### Procedure:

1. Apply a color bar pattern
2. Adjust DAC "TINT" so that the fourth bar from right to left becomes purple and good color balance.
3. If the adjustment is high, the bar will look pinkish, if it is low will

look bluish.

4. Adjust “B-Y\_G” so blue look natural, and the rest of the colors become in balance.
5. Adjust “R-Y\_A” so red look natural, and rest of the colors become in balance.
6. Check that white bar is real white, no bluish or reddish or tending to become grey.

#### 17.14. Tint and color check

Set picture mode to VIVID mode. Again, the service ability to see color and the balance of color is important for these adjustments.

Tint check

1. In picture menu set PICTURE NORMAL to YES.
2. Apply color bars to the video input.
3. Magenta is composed of two colors, blue and red.
4. Check to see that magenta does not have too much blue or too much red.
5. Check cyan. Cyan is composed of blue and green. It should not have too much blue or green.
6. Use a test signal from a VCR or laser disk that has a pre-recorded close up of a signal that has good flesh tones.
7. The signal on the VCR or laser disk should look normal.

Color Check

Using a clean RF or video signal, set the color level so that it does not saturate or appear harsh. Make sure that color is not set so that it appears dull and washed out. Look for natural colors, try to adjust the picture to appear as a normal photograph.

#### 17.15. Clock Adjustment (CLOCK)

Preparation:

Connect the frequency counter from TP0PLL (A-Board Connector A31 pin 56) to cold ground.

Note:

Frequency Counter probe capacitance should be 8pF or less.

Procedure:

1. Turn the PTV “ON” with the A.C. power applied.
2. Measure TP0PLL (A-Board Connector A31 pin 56) for frequency and record the reading.

Note:

Pin measurement must have at least four digits of resolution following the decimal point.

Example: 000.0000

3. Place the PTV into service mode for making electronic adjustment, select the clock adjustment DAC CLOCK and change value to 128.
4. Calculate and set CLOCK based on the following formula:

$$CLOCK = 128 + 0.450 \times 1063 \frac{(732.422 - TP0PLL [Hz])}{732.4220}$$

Note:

TP0PLL measurement will not change regardless of the value stored in CLOCK.

### 17.16. Receiver Firmware Upgrade

1. First check that receiver is operating out of service mode (normal use).  
**IMPORTANT:**  
For better results in this procedure, be sure that the set is already powered ON and if the set is powered OFF, wait at least 10 seconds after turning ON the receiver before inserting the SD service card to the service slot.
2. Check the current software version of receiver by pressing on front panel the next sequence rapidly:  
VOLUME UP and MENU buttons at the same time, then CHANNEL UP and MENU buttons at the same time.
3. A status screen will appear displaying information about the System.
4. The “System” information displays the current software version of

the receiver along with the release date.

5. Insert the SD service card in the back of the receiver in the slot with a sign "SERVICE ONLY".
6. The receiver will automatically display a screen, showing the current software version of the receiver (right) and the software version stored in the SD service card (left), (i.e. ROM Ver: 00010306 indicates that current ROM version is 1.3.6.). In case that receiver doesn't show this screen enter service mode (see service mode page 27), display the service menu by pressing POWER on the remote and select "SD\_DL" DAC register.
7. Press OK button on the remote to start the software upgrade on the receiver.  
**IMPORTANT:**  
ONCE THAT DOWNLOADING PROCESS HAS BEGUN IT CANNOT BE CANCELLED. DURING SOFTWARE DOWNLOADING DO NOT DISCONNECT THE AC PLUG FROM OUTLET!!, THIS COULD RESULT IN A PERMANENT DAMAGE TO THE SERVICE CARD AND TO THE RECEIVER AS WELL.
8. Once that the download is complete a screen appears with the next instructions:
  - A. Remove the SD card from the back of the TV set.
  - B. Disconnect the power cable from the wall outlet.
  - C. Reconnect the power cable to the wall outlet.
9. Press POWER on the receiver to turn ON.
10. Check the current software version of receiver by pressing on front panel the next sequence rapidly:  
VOLUME UP and MENU buttons at the same time, then CHANNEL UP and MENU buttons at the same time.
11. Press EXIT to clear the screen and go back to normal use mode.

### **17.17. JPEG Viewer Software Upgrade**

1. With the receiver powered ON, insert the SD service card in the front panel slot, then automatically, a download menu will appear. If the download menu doesn't appear. Enter service mode, display the service menu by pressing POWER on the remote and select "JPEG" DAC register. Select option No. 6 with CH keys to access the



**“JPEG Program Download” menu.**

**NOTE:**

To abort the download process just press “EXIT” on remote in the “JPEG Program Download” menu.

**IMPORTANT:**

For better results in this procedure, be sure that the set is already powered ON and if the set is powered OFF, wait at least 10 seconds after turning ON the receiver before inserting the SD service card to the JPEG viewer slot.

2. Select the newest version of software with CH keys, then press OK.
3. A confirmation sign appears asking if the selected version wants to be downloaded, then with VOL keys select “YES” and press OK to start downloading.

**IMPORTANT!:**

ONCE THAT DOWNLOADING PROCESS HAS BEGUN IT CANNOT BE CANCELLED. DURING SOFTWARE DOWNLOADING DO NOT DISCONNECT THE AC PLUG FROM OUTLET!!, THIS COULD RESULT IN A PERMANENT DAMAGE TO THE SERVICE CARD AND TO THE RECEIVER AS WELL.

4. Once the downloading is finished, disconnect the AC plug from outlet then remove the SD service card from the slot.
5. Connect again the AC plug to the outlet and turn power ON.
6. Press both OK and POWER buttons on the receiver’s front panel to access to the self-check screen and wait a few seconds.
7. If the JPEG module is working accordingly, a “JPEG OK” sign will appear and within, the last upgrade version of the JPEG viewer software, i. e. “JPEG OK : 01.00.04” .
8. Press any key to exit the self-check screen or unplug AC cord to completely reset.

### **17.18. JPEG Factory and Service Mode (JPEG)**

1. Enter service mode, and with the SD service card already inserted (JPEG viewer slot), from the service menu select “JPEG” DAC register.
2. A screen displaying the “JPEG Factory and Service Mode” menu will appear with 6 options and at the bottom the current JPEG

software version.

3. To select one of the options press the CH keys on remote.
4. Option No. 1 will perform an auto test from option No. 2 through No. 5.
  - SDRAM Test: will perform a test of the internal memory of the JPEG reader device, showing for a few seconds a green screen followed by a magenta screen. If the test is successful an OK flag will appear on menu.
  - Color bar Test: this will perform a color display test in the JPEG reader device showing in the screen a color rainbow bar pattern at the top and a black and white pattern at the bottom. If the colors are shown correctly the JPEG color driver is working properly. Press exit on remote to go back to service menu.
  - SD Card Test: this will perform a JPEG picture reading test on the SD Card. The SD card inserted must have pictures with JPEG format to pass the test.
  - PC Card Test: this will perform a JPEG picture reading test on the PC Card. The PC card inserted must have pictures with JPEG format to pass the test.
  - Download: enters to the "JPEG Program Download" menu.
5. Press EXIT to go back to service mode.

#### **17.19. CableCARD check**

1. First check that receiver is operating out of service mode (normal use).
2. Insert the CableCARD (POD).
3. Check that the fan on the back of the set should be turned ON.  
**IMPORTANT:**  
If the fan is disconnected accidentally or if the fan is damaged and it's not turned ON when the module is inserted, the PTV will automatically be set in protection mode and it will shut down. Connect again the fan correctly or replace it with a new one (for order number see parts list section) and press power to turn ON.
4. A sign on the screen with instructions should appear indicating that the CableCARD has been inserted.
5. Check the current software version of receiver by pressing on

front panel the next sequence rapidly:

**VOLUME UP** and **MENU** buttons at the same time, then **CHANNEL UP** and **MENU** buttons at the same time.

6. A status screen will appear displaying information about the System status.
7. The “System” information displays the current software version, release date, memory and POD status.
8. If the CableCARD is operating properly the POD status will indicate that the CableCARD is present. If the CableCARD is inserted and the POD status indicates that is not present, the CableCARD could be damaged.
9. To exit the system status screen, press exit.
10. Remove the CableCARD and check that a sign on the screen appears indicating that the card has been removed.

## **18. Convergence adjustment**

Turn PTV on and allow it to warm up for 30 minutes prior to perform adjustments (apply a WHITE PATTERN).

### **Helpful Hint:**

EEPROM jig can be used to adjust convergence, by copying convergence adjustment from a convergence adjusted PTV to other. Refer to EEPROM copy jig section on this service manual. Also EEPROM copy jig can be used to back-up the data before to perform adjustments.

### **NOTE:**

1080i, 480p, 480i pattern can be obtained from Panasonic’s TU-DST51 set-top box DTV decoder.

### **IMPORTANT NOTICE:**

It is strongly recommended to first read and understand the following section prior to make any adjustment.

This PTV uses the scheme described below to correct for misconvergence of the three CRT projection tubes. There are various modes to this operation.

### **Preparation:**

Place the convergence alignment template (see Convergence alignment template section on this manual) over the PTV screen. Align the center lines of the template with the mechanical center markers on the PTV screen frame. If the template is not available, create one using the dimensions provided in Convergence alignment template section on this manual. Remote control must be used during the procedure.

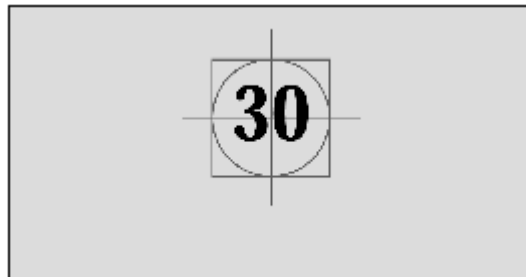
**Procedure:**

Apply the convergence alignment template to the PTV screen frame to converge the green raster only. Remove the convergence alignment template following this alignment. The red and blue rasters can then be aligned to the green raster.

**Raster Set-Up:**

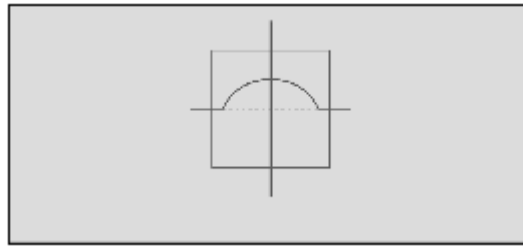
- 1. Enter to service mode (red CHK).**
- 2. In SET-UP (menu) enter to “Other Adj.” menu and set CONVERGENCE values (GH, GV) to 0.**
- 3. Cover red & blue lens with caps.**
- 4. Apply a pattern to adjust with 1080i format:**
- 5. Select “COARSE” DAC, then press OK to enter to “Coarse adjustment” mode.**
- 6. Press “0” key on remote.**
- 7. Press OK key on remote to enter to “TEST\_POS” mode.**
- 8. Move pattern by pressing VOL right - left and CH up - down so that the cursor center overlap monoscope pattern center.**

Aligned cross-hair pattern with center of picture pattern



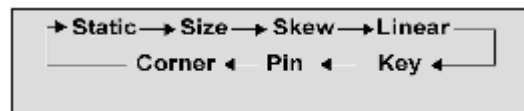
- 9. Press “5” key on remote to exit superimpose mode (monoscope pattern disappear).**
- 10. Press “TV/VIDEO” key to enter “DATA\_POS” mode**
- 11. Adjust by pressing VOL right - left so that peak of curve is the same position as center of cursor**

Symmetrical shape



12. Press “TV/VIDEO” key on remote to enter “OSD\_POS” mode.
13. Press “5” key on remote so that monoscope pattern appears (superimpose mode)
14. Move cursor by pressing VOL right - left and CH up - down so that cursor center overlap monoscope pattern center
15. Press “0” key to go back to “Coarse adjustment” mode.
16. Press “TV/VIDEO” key to cycle through “Coarse adjustment” options

“COARSE” modes cycle



17. To change to “Fine Adjustment Mode” options (“FINE” DAC), press “TV/VIDEO” key on remote for at least 3 seconds, to go back to “Coarse Adjustment Mode” options press “TV/VIDEO” on remote again for 3 seconds.
18. In “Fine Adjustment Mode” options, press “MUTE” key on remote to switch between “cursor” mode and “data” mode.
  - Cursor mode: Allows cursor movement by pressing VOL right - left and CH up - down.
  - Data mode: Allows making adjustment by pressing VOL right - left and CH up - down.
19. Either “Coarse Adjustment” options or “Fine Adjustment” options, press “R-TUNE” repeatedly key on remote to cycle through different color adjustments (R, G, B, White)
20. In “Fine Adjustment” options, press “4” key on remote to ADD crossed sections to pattern and make effect visible between crossed sections.

**21. To store adjustments press “7”, then “OK” key on remote, otherwise press “POWER” then “OK” to exit adjustments without saving.**

**22. Remote functions, PRESS:**

<b>PRESS BUTTON</b>	<b>TO</b>
<b>1(forward) or 3(back)</b>	<b>change viewed color</b>
<b>2</b>	<b>change pattern</b>
<b>4 (only FINE mode)</b>	<b>change crossed sections</b>
<b>5</b>	<b>overlap</b>
<b>* 7</b>	<b>save data</b>
<b>8</b>	<b>copy from</b>
<b>9</b>	<b>clear</b>
<b>POWER</b>	<b>exit</b>
<b>RECALL</b>	<b>display values</b>
<b>R-TUNE</b>	<b>cycle colors</b>
<b>TV/VIDEO</b>	<b>change mode</b>
<b>TV/VIDEO (3 secs)</b>	<b>switch convergence mode (FINE/ COARSE)</b>

\*

When “7” is pressed and the data is saved, it will overwrite the factory default.

## **18.1. Coarse adjustment mode (COARS)**

**NOTE:**

1080i, 480p, 480i pattern can be obtained from Panasonic’s TU-DST51 set-top box DTV decoder.

**NOTE:**

It is strongly recommended to first read and understand the following section prior to make any adjustment. / Convergence adjustment must be performed for 480i\_p (same for interlace & progressive), ZOOM 480i and 1080i.

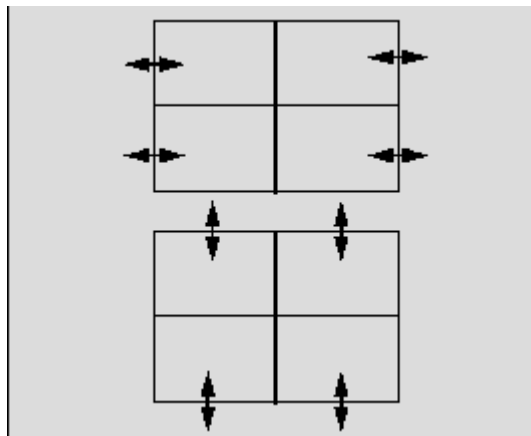
**Procedure:**

**1. Enter to “G-SIZE” mode:**

- Select “COARSE” DAC**
- Press OK on remote**

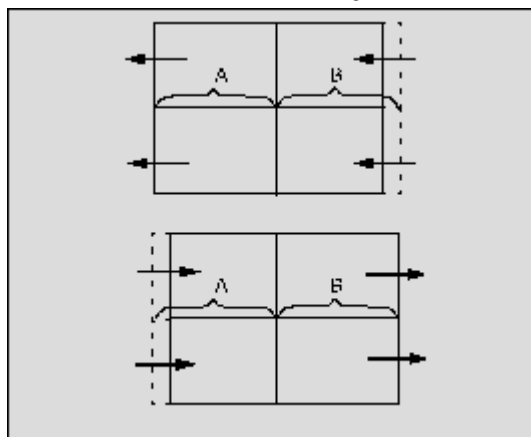
- TV/VIDEO (repeatedly)
  - R-TUNE (repeatedly)
2. Press “2” repeatedly and apply the pattern of border and cross.
  3. Press “RECALL” key to display values
  4. Adjust size so that the line of the border closes to the screen frame at top, bottom, left and right, by pressing CH up-down and VOL right-left

“SIZE” mode adjustment



5. Press “7” then “OK” key on remote to save changes.
6. Enter to linearity “G-LINEAR” mode by pressing “TV/VIDEO”.
7. Adjust linearity by pressing VOL right-left until A=B.

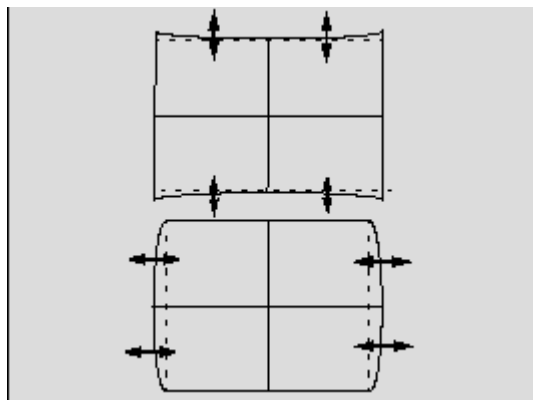
“LINEAR” mode adjustment



8. Press “7” then “OK” key on remote to save changes.
9. Enter to PIN “G-PIN” mode by pressing “TV/VIDEO”
10. Adjust V\_PIN by pressing CH up-down (see figure)
11. Adjust H\_PIN by pressing VOL right-left.

**12. Press “7” then “OK” key on remote to save changes**

“PIN” mode adjustment

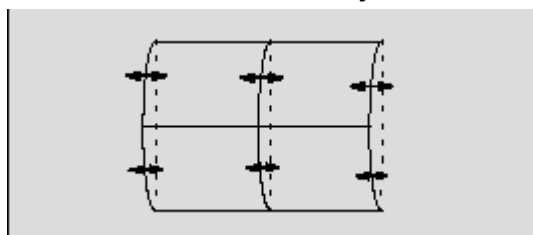


**13. Press “7” then “OK” key on remote to save changes**

**14. Adjust by pressing VOL right-left (see figure)**

**15. Press “7” then “OK” key on remote to save changes**

“CORNER” mode adjustment

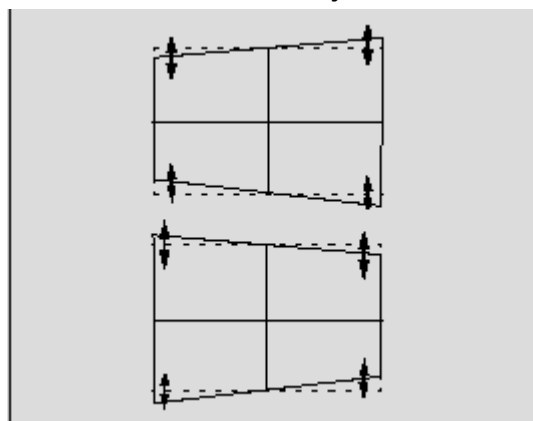


**16. Enter to KEY “G-KEY” mode by pressing TV/VIDEO.**

**17. Adjust by pressing CH up-down (see figure)**

**18. Press “7” then “OK” key on remote to save changes**

“KEY” mode adjustment



**NOTE:**

Confirm that pattern looks like a square and almost overlaps the screen frame, check that vertical and horizontal line center match with the marks on screen frame, if linearity is not good



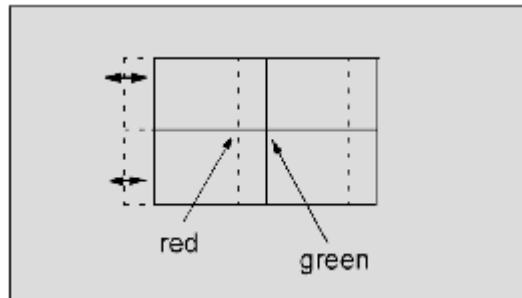
enough, repeat adjustments.

**19. Enter to “STATIC” mode by pressing TV/VIDEO.**

**20. Press “1” or “3” repeatedly until green and red only are shown.**

**21. Adjust “R-STATIC” so that the center of red overlaps with the center of green**

“STATIC” mode adjustment

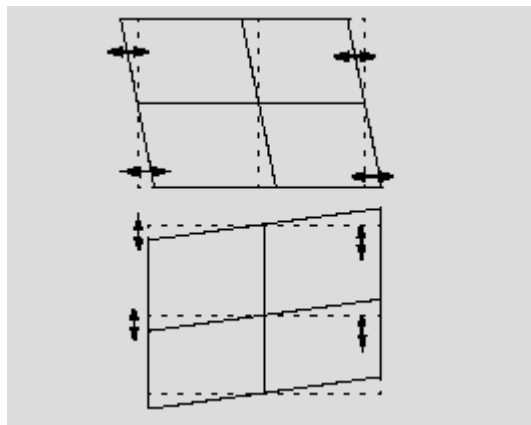


**22. Enter to SKEW “R-SKEW” mode by pressing TV/VIDEO**

**23. Adjust “R-SKEW” so that the vertical and horizontal line of center overlaps with green (see figure)**

**24. Press “7” then “OK” key on remote to save changes**

“SKEW” mode adjustment



**NOTE:**

Remember always save data following each adjustment by pressing “7” key on remote, then OK.

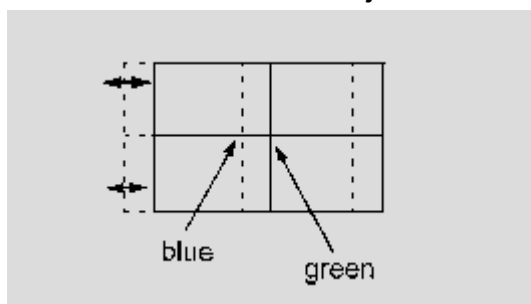
**25. Enter to LINEARITY “R-LINEAR” mode by pressing TV/VIDEO.**

**26. Adjust Horizontal linearity (see figure)**

**27. Enter to SIZE “R-SIZE” mode by pressing TV/VIDEO.**

28. Adjust so that the line on the border closes to the screen frame at top, bottom, left and right (see figure).
29. Enter to PIN “R-PIN” mode by pressing TV/VIDEO
30. Adjust horizontally and vertically (see figure)
31. Enter to CORNER “R-CORNER” mode by pressing TV/VIDEO.
32. Adjust corners (see figure).
33. Enter to KEY “R-KEY” mode by pressing TV/VIDEO
34. Adjust KEY (see figure).
35. Display pattern of border and cross, then check that red overlaps green pattern, if it is not satisfactory, repeat from step 19.
36. Enter to STATIC “B-STATIC” mode.
37. Press “1 or 3” key repeatedly on remote until only green and blue pattern are displayed.
38. Adjust B-STATIC so that the center of blue overlaps with the center of green (see figure).

“B-STATIC” mode adjustment



39. Perform all adjustments for blue (B-SKEW, B-LINEAR, B-SIZE, B-PIN, B-CORNER, B-KEY)
40. Display border and cross pattern and confirm that blue overlaps with green pattern, if it is not satisfactory, repeat for blue.
41. Press “1 or 3” key repeatedly on remote until green, red and blue (white), confirm that red and blue overlaps with green pattern.
42. Press “7” key on remote, then OK to save changes.
43. Press POWER then OK to exit adjustments or press TV/VIDEO for at least 3 seconds to change to Fine Adjustment Mode.

## 18.2. Fine adjustment mode (FINE) (convergence)

**NOTE:**

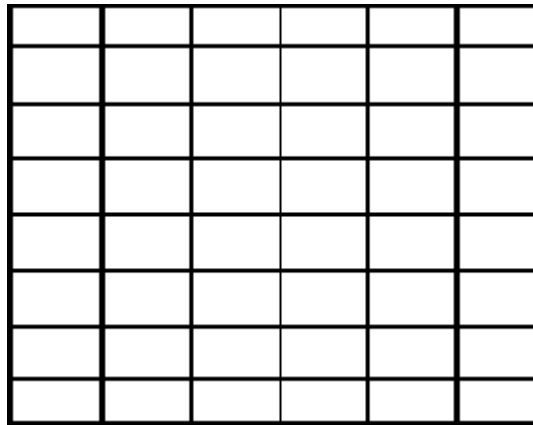
It is strongly recommended to first read and understand the following section prior to make any adjustment.

**HELPFUL HINT:**

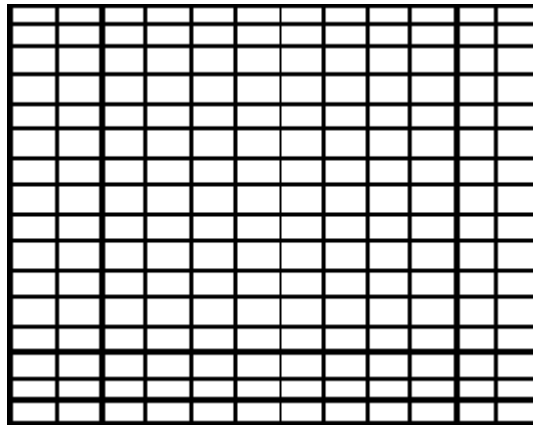
The easiest way to adjust convergence is to start adjusting from the center of the screen to the borders in all the convergence adjustments.

Once in "FINE" convergence mode press "4" on remote control frequently to change crossed sections, this helps to check convergence more accurate in more sections of the picture. Please see the following figures that show the cycle, this does not have any effect on the positions of the cursor.

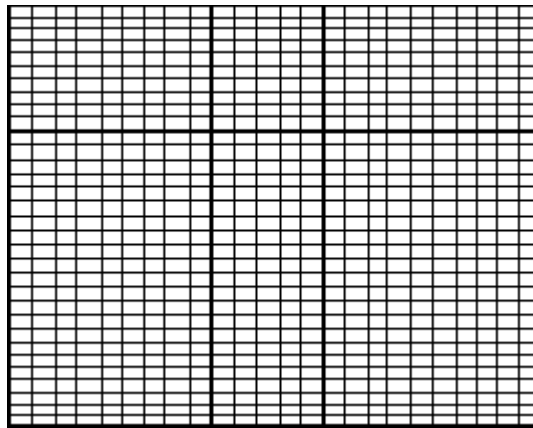
**"FINE" convergence mode default Grid**



**"FINE" convergence mode after pressing "4" on remote**



**"FINE" convergence mode after pressing "4" on remote**



PRESS BUTTON	TO
1(go) or 3(back)	change color view
2	change pattern
4 (only FINE mode)	change crossed sections
5	overlap
* 7	save data
8	copy from
9	clear
POWER	exit
RECALL	display values
R-TUNE	cycle colors
TV/VIDEO	change mode
TV/VIDEO (3 secs)	switch convergence mode (FINE/ COARSE)

\*

When “7” is pressed and the data is saved, it will overwrite the factory default.

In “FINE ADJUSTMENT MODE” options, press “MUTE” key on remote to switch between “cursor” mode and “data” mode.

- **Cursor mode (cursor flashing):** Allows cursor movement by pressing VOL right - left and CH up - down.
- **Data mode (cursor fixed):** Allows making adjustment by pressing VOL right - left and CH up - down.

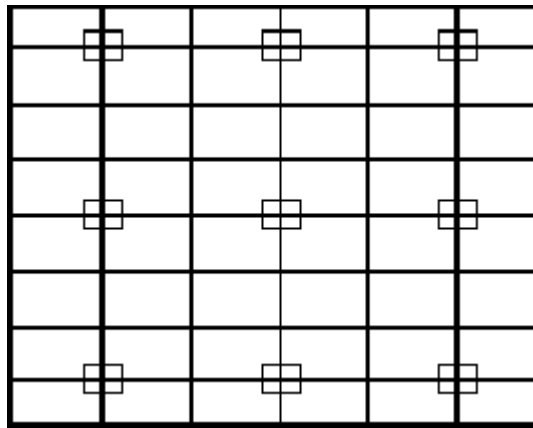
PROCEDURE:

**1. To Enter to “G-EASY” mode (for green):**

- **Select “FINE” DAC**
- **Press OK on remote**

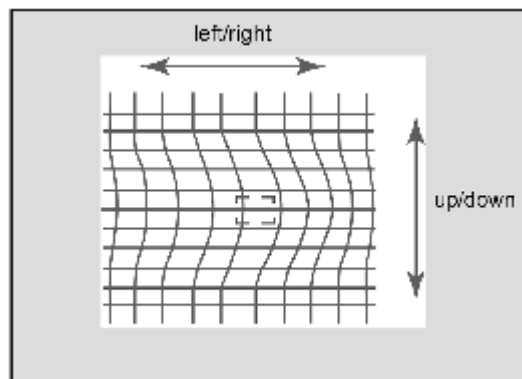
- Press TV/VIDEO (repeatedly) to select mode.
  - Press R-TUNE (repeatedly) to select color
2. Press “2” repeatedly and apply the pattern of crosshatch.
  3. Press “4” frequently to change crossed sections, this helps to check convergence more accurate in more sections of the picture.
  4. Press “1 or 3” repeatedly until the pattern becomes green.
  5. Press RECALL to display values.
  6. In “EASY” mode, the adjustment value changes by 4 steps
  7. “EASY” mode allows to move lines horizontally and vertically from the center of cursor

“EASY” mode adjustment, possible locations for cursor



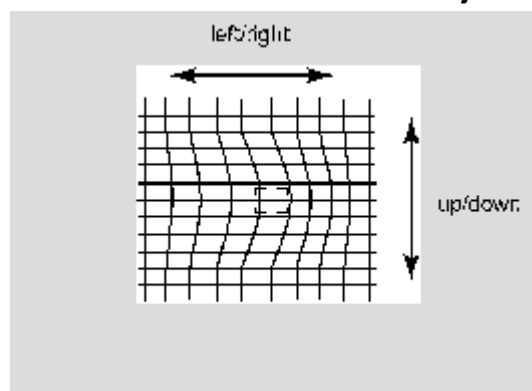
8. This mode affects a wide area around the cursor than other adjustment modes, See values on screen by pressing RECALL on remote
9. Begin adjustment from the center to the edge of the screen.
10. Adjust when the cursor is not flashing by pressing CH up/down and VOL right/left on the remote control, if the cursor is flashing press MUTE on the remote

“EASY” mode adjustment



11. To move the cursor press **MUTE** on the remote (cursor flashes), then move the cursor to any of the positions for “EASY” mode
12. This adjustment may help to make rounded lines become straight lines.
13. Adjust to make lines as straight as possible
14. Enter to POINT “G-POINT” (for green) mode by pressing TV/VIDEO.
15. “POINT” mode allows to move line horizontally and vertically from the perimeter of cursor making rounded lines become straight
16. In “POINT” mode, the adjustment data changes by 2 steps, See values on screen by pressing **RECALL** on remote
17. When the cursor is located in the outer area of the border the cursor starts to flash from one side to other, the location is for the non-visible area and the most outer side of screen (inside the ovals area, see figure); This applies to “LINE”, “POINT” & “ORIGIN.POINT” modes.
18. Begin adjustment from the center to the edge of the screen

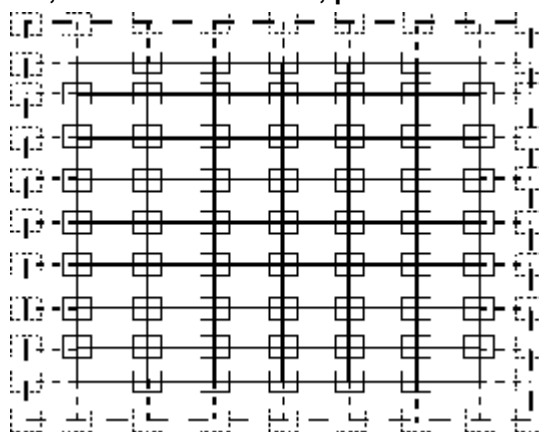
“POINT” & “ORIG. POINT” mode adjustment



19. Adjust to make lines as much straight as possible

20. When slightly adjustment is needed, use “ORIG. POINT” mode.
21. To enter to “G-ORIG. POINT” (for green) mode press TV/VIDEO.
22. With “ORIG. POINT”, the adjustment data changes by 1 step, this allows more detail in the adjustment. Display values on screen by pressing RECALL on remote
23. Confirm that green adjustment is good enough, if adjustment is not satisfactory, repeat adjustments.
24. Enter to LINE “G-LINE” mode by pressing TV/VIDEO.
25. LINE mode allows to move each single line horizontally and vertically (see figure)
26. Begin adjustment from the center to the edge of the screen (see figure)
27. Adjust to make distribute lines

LINE, POINT, ORIG. POINT modes, possible locations for cursor

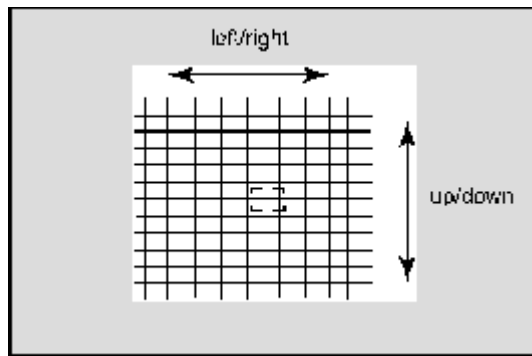


28. Then press “1 or 3” on the remote until red and green appears.

**NOTE:**

Since convergence adjustment will not allow to adjust every single cross section of the grid, it is very important to adjust, so that overall looks best, in “FINE” mode press “4” frequently on remote control to cycle crosshatch pattern to verify convergence.

“LINE” mode adjustment

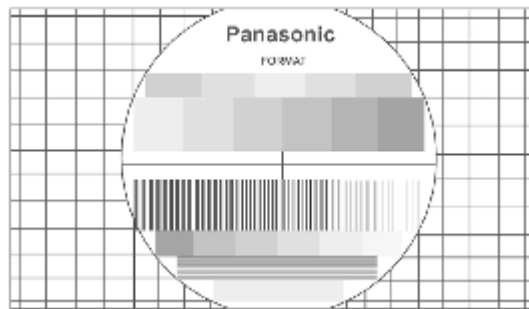


29. Perform adjustments for red so that red overlaps green, do not move green.
30. Press “1 or 3” on the remote until yellow (red and green) and blue appears, do not move green or red.
31. Perform adjustments so that blue overlaps Yellow (red and green).
32. Press “1 or 3” key on remote to display red, green and blue (white).
33. At this point the crosshatch pattern should look white.
34. If the crosshatch pattern is not only white, repeat adjustment for that specific color (red or blue).
35. Once the crosshatch pattern looks only white, perform the adjustments for White only (“POINT”, “ORIG. POINT” & “LINE”), notice that each adjustment must be only for white (red, green, blue).
36. Adjust white for a good line distribution and make lines completely straight.
37. Press “7” key on remote, then OK to save changes.
38. Press POWER then OK to exit convergence adjustments (DACs menu appears).

### 18.3. Horizontal and vertical size check

1. Apply a pattern that permits to check that horizontal and vertical proportion of the image is correct
2. Confirm that horizontal and vertical center of the picture is located in the center of the screen.
3. Check that the image is proportional horizontally and vertically, proportion is different on every aspect.





#### 18.4. Convergence alignment template

The convergence alignment template is a grid approximately the size of the viewing screen used to ensure the proper size and shape of the alignment rasters. It is 6 blocks across by 8 blocks high. The grid dimensions vary with the mode of operation. Apply a convergence alignment template to the viewing screen of the PTV. Make sure the center lines are properly aligned. If a template is not available, one can be created by following the instructions below. Create a convergence alignment template by drawing a pattern, as in the figure, in the actual dimensions on transparent film or tracing paper. Start with the Horizontal and Vertical Center Axis and work outwards until the pattern is complete. Pay attention to the actual dimensions of the pattern.

Template dimensions:

- 47" Models: 1036mm horizontal x 584mm vertical.
- 53" Models: 1036mm horizontal x 584mm vertical.

Grid dimensions:

SCREEN	MODE	HORIZONTAL	VERTICAL
47"	1080i	40.00 mm	20.80 mm
53"	1080i	46.60 mm	23.10 mm

#### NOTE:

A convergence alignment template, part number TXFQD01ESER2 for 47" and TXFQD01FSER1 for 53" is available through Matsushita/Panasonic Services


## 19. Reference of PDF links color

DESCRIPTION OF PDF LINK COLORS	
TYPE	DESTINATION
<b>SCHEMATIC</b>	
YELLOW ON IC	IC ON PCB
YELLOW ON CONNECTOR	CONNECTOR ON PCB
YELLOW ON SCHEMATIC	PCB
CYAN	WAVEFORM
GREEN ON SIDE	SCHEMATIC CONTINUED
GREEN ON CONNECTOR	CONNECTOR CONNECTION
BLUE ON IC	VOLTAGE
<b>PCB</b>	
BLUE ON IC	IC ON SCHEMATIC
BLUE ON CONNECTOR	CONNECTOR ON SCHEMATIC
BLUE ON PCB	SCHEMATIC
GREEN ON SIDE	PCB CONTINUED
<b>BLOCK DIAGRAMS</b>	
GREEN ON IC	IC ON SCHEMATIC
GREEN ON SIDE	BLOCK DIAGRAM CONTINUED

## 20. Conductor views

[20.1. A-Board Printed Circuit \( page 1 of 2 \)](#)

[20.2. A-Board Printed Circuit \( page 2 of 2 \)](#)

[20.3. D-Board Printed Circuit \( page 1 of 2 \)](#)

- 20.4. D-Board Printed Circuit ( page 2 of 2)
- 20.5. DC-Board Printed Circuit ( bottom view)
- 20.6. DC-Board Printed Circuit ( top view )
- 20.7. DG-Board Printed Circuit (bottom view)
- 20.8. DG-Board Printed Circuit ( top view )
- 20.9. DT-Board Printed Circuit ( bottom view )
- 20.10. DT-Board Printed Circuit ( top view )
- 20.11. DV-Board Printed Circuit ( bottom view )
- 20.12. DV-Board Printed Circuit ( top view )
- 20.13. H-Board Printed Circuit
- 20.14. JG-Board Printed Circuit (bottom view)
- 20.15. JG-Board Printed Circuit (top view)
- 20.16. K, G & R Printed Circuit Boards
- 20.17. LB-Board Printed Circuit
- 20.18. LG-Board Printed Circuit
- 20.19. LR-Board Printed Circuit
- 20.20. T-Board Printed Circuit

## **21. Block diagrams**

- 21.1. Audio block diagram page (1 of 2)
- 21.2. Audio block diagram (page 2 of 2)
- 21.3. Video block diagram (page 1 of 2)
- 21.4. Video block diagram (page 2 of 2)

## **22. Schematic diagrams**

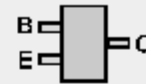
- 22.1. Schematic diagrams notes

## Notes:

### IMPORTANT SAFETY NOTICE

THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES THAT ARE IMPORTANT FOR PROTECTION FROM X-RADIATION, FIRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS DESIGNATED WITH A  $\Delta$  IN THE SCHEMATIC.

### CHIP TRANSISTOR LEAD DESIGNATION



### SCHEMATIC NOTES

- Resistors are carbon 1/4W unless noted otherwise.
  - Capacitors are ceramic 50V unless noted otherwise.
  - Coil value notes is inductance in  $\mu$ H.
  - Test point indicated by  $\uparrow$ ; Test point but no pin  $\uparrow$ .
  - Components indicated with  $\Delta$  are critical parts and replacement should be made with manufacture specified replacement parts only.
  - (BOLD LINE) indicates the route of B+ supply.
  - The schematic diagrams are current at the time of printing and are subject to change without notice.
  - Ground symbol  $\downarrow$  indicates **HOT GROUND CONNECTION**;  $\nabla$  indicates COLD GROUND.
- NOTE: All other component symbols are used for engineering design purposes.*

### VOLTAGE MEASUREMENTS

- Voltage measurement:  
AC input to the Receiver is 120V, NTSC (I-D, 1125i & 525P when applicable) signal generator is connected to the antenna of the Receiver. (Color bar pattern of 100 IRE white and 7.5 IRE black.)  
- All Picture and Audio adjustments are set to Normalize.  
TV ANT/CABLE - (Set-Up Menu) in TV/ANT Mode  
Volume - Min.  
TV/Video SW - TV position  
Audio Mode - Stereo
- Voltage readings are nominal and may vary +10% on active devices. Some voltage reading will vary with signal strength and picture content.
- Supply voltages are nominal.
- Ground symbol  $\downarrow$  indicates ground lead connection of meter. Incorrect ground connection will result in erroneous readings.
- CAUTION: Incorrect ground connection of the test equipment will result in erroneous readings.**

### WAVEFORM MEASUREMENTS


- $\textcircled{3}$  indicates waveform measurement. (Measurement can be taken at the best accessible location in common to the indicated point.)
  - Taken with an NTSC signal generator connected to the antenna terminal. (NTSC color bar pattern of 8 bars of EIA colors, 100 IRE white and 7.5 IRE black.)
  - Customer Controls (Picture/Audio Menu) are set to Normalize. Volume is set to "MIN".
  - All video and color waveforms are taken with a wideband scope and a probe with low capacitance (10 to 15 pF). Shape and peak altitudes may vary depending on the type of Oscilloscope used and its settings.
  - Ground symbol  $\downarrow$  shown on waveform number indicates (Hot) ground lead connection of the Oscilloscope.
- CAUTION: Incorrect ground connection of the test equipment will result in erroneous readings.**



## **22.2. Notas de los diagramas esquemáticos**

## Notas







### NOTA DE SEGURIDAD

LOS DIAGRAMAS ELÉCTRICOS INCLUYEN CARACTERÍSTICAS ESPECIALES MUY IMPORTANTES PARA LA PROTECCIÓN CONTRA RAYOS-X, QUEMADURAS Y DESCARGAS ELÉCTRICAS. CUANDO SE DE SERVICIO ES IMPORTANTE USAR PARA REEMPLAZO DE COMPONENTES CRÍTICOS, SOLO PARTES ESPECIFICADAS POR EL FABRICANTE. LOS COMPONENTES CRÍTICOS ESTÁN SEÑALADOS EN LOS DIAGRAMAS POR EL SÍMBOLO .


### IDENTIFICACIÓN DE TERMINALES PARA TRANSISTORES EN CHIP





### NOTAS DE LOS DIAGRAMAS

- Las Resistencias son de Carbón de 1/4W. a menos que se indique otra característica.
  - Los Capacitores son de Cerámica para 50V a menos que se indique otra característica.
  - El valor indicado de las Bobinas es la inductancia expresada en  $\mu\text{H}$ .
  - Los puntos de prueba en la terminal de algún componente son indicados por . Los puntos de prueba fuera de los componentes se indican con .
  - Los componentes señalados con el símbolo  son considerados componentes críticos y deben ser reemplazados sólo con las partes especificadas por el fabricante.
  -  (LINEA GRUESA): indica las líneas de alimentación de los Voltajes E+.
  - Los diagramas eléctricos están sujetos a cambio sin previo aviso.
  - El símbolo  indica que es una conexión a **Tierra Caliente** y al símbolo  indica conexión a **Tierra Fría**.
- NOTA:** Los demás símbolos de componentes incluidos son usados con fines de diseño.

### MEDICIÓN DE VOLTAJES

- Medición de voltaje:
    - El voltaje de entrada al Receptor es de 120V de Corriente Alterna. Un generador de patrones con formato NTSC se conecta a la entrada de la antena. (Patrón de Barras de Colores con 100 IREs para el Blanco y 7.5 IREs para el Negro.)
    - Los ajustes de los Menus Picture y Audio se normalizan. En el Menú Set-Up, en la opción ANTENA, se selecciona el modo de CABLE. El nivel de Volumen se minimiza. De los modos TV y Video, seleccionar el modo TV. Seleccionar modo Estereo del Audio.
  - Las mediciones de los voltajes son nominales y pueden variar hasta 10% en componentes en funcionamiento. Las lecturas de los voltajes pueden variar por la potencia de la señal y el contenido de la imagen.
  - Las fuentes de voltajes son nominales.
  - El símbolo  indica el tipo de tierra que se utiliza en la conexión del medidor.
- PRECAUCION:** Si no se utiliza la conexión a la tierra adecuada, se obtendrán mediciones equivocadas y podría dañar el equipo de medición.

### MEDICIÓN DE FORMAS DE ONDA

- Un símbolo como  indica el punto para medir una señal. (La medición puede hacerse en el punto con mayor accesibilidad, siempre que sea común al indicado.)
  - Se midieron utilizando un generador con formato NTSC conectado a la terminal de la antena. (Patrón de 8 Barras de Colores EA, formato NTSC de 100 IREs para el Blanco y 7.5 IREs para el Negro.)
  - Los ajustes de usuario de los Menus PICTURE y AUDIO se normalizaron. Posteriormente el nivel de volumen se
  - banda alta y con un punto de prueba de baja capacitancia (10 a 1). La forma y amplitud de las ondas puede variar según el tipo de osciloscopio que se utilice y sus características.
  - El símbolo de tierra  que aparece junto al número de la forma de onda, indica que se utiliza conexión a **Tierra Caliente** en el extremo negativo de la punta de prueba.
- PRECAUCION:** Si no se utiliza la conexión a la tierra adecuada, se obtendrán

ajusta al mínimo. 4. Las formas de onda de Video y Color fuera tomadas con un osciloscopio de	<i>Si la forma de onda, se encuentran  mediciones equivocadas y podría dañar el  equipo de medición.</i>
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**22.3. A-Board schematic 1 of 4**

**22.4. A-Board schematic 2 of 4**

**22.5. A-Board schematic 3 of 4**

**22.6. A-Board schematic 4 of 4**

**22.7. D-Board schematic 1 of 6**

**22.8. D-Board schematic 2 of 6**

**22.9. D-Board schematic 3 of 6**

**22.10. D-Board schematic 4 of 6**

**22.11. D-Board schematic 5 of 6**

**22.12. D-Board schematic 6 of 6**

**22.13. DC-Board schematic**

**22.14. DG-Board schematic 1 of 8**

**22.15. DG-Board schematic 2 of 8**

**22.16. DG-Board schematic 3 of 8**

**22.17. DG-Board schematic 4 of 8**

**22.18. DG-Board schematic 5 of 8**

**22.19. DG-Board schematic 6 of 8**

**22.20. DG-Board schematic 7 of 8**

**22.21. DG-Board schematic 8 of 8**

**22.22. DT-Board schematic 1 of 15**

**22.23. DT-Board schematic 2 of 15**

**22.24. DT-Board schematic 3 of 15**

**22.25. DT-Board schematic 4 of 15**

**22.26. DT-Board schematic 5 of 15**

**22.27. DT-Board schematic 6 of 15**  
**22.28. DT-Board schematic 7 of 15**  
**22.29. DT-Board schematic 8 of 15**  
**22.30. DT-Board schematic 9 of 15**  
**22.31. DT-Board schematic 10 of 15**  
**22.32. DT-Board schematic 11 of 15**  
**22.33. DT-Board schematic 12 of 15**  
**22.34. DT-Board schematic 13 of 15**  
**22.35. DT-Board schematic 14 of 15**  
**22.36. DT-Board schematic 15 of 15**  
**22.37. DV-Board schematic 1 of 5**  
**22.38. DV-Board schematic 2 of 5**  
**22.39. DV-Board schematic 3 of 5**  
**22.40. DV-Board schematic 4 of 5**  
**22.41. DV-Board schematic 5 of 5**  
**22.42. G, K, R-Boards schematics**  
**22.43. H-Board schematic 1 of 3**  
**22.44. H-Board schematic 2 of 3**  
**22.45. H-Board schematic 3 of 3**  
**22.46. JG-Board schematic 1 of 4**  
**22.47. JG-Board schematic 2 of 4**  
**22.48. JG-Board schematic 3 of 4**  
**22.49. JG-Board schematic 4 of 4**  
**22.50. LB-Board schematic 1 of 2**  
**22.51. LB-Board schematic 2 of 2**  
**22.52. LG-Board schematic 1 of 2**



**22.53. LG-Board schematic 2 of 2**

**22.54. LR-Board schematic 1 of 2**

**22.55. LR-Board schematic 2 of 2**

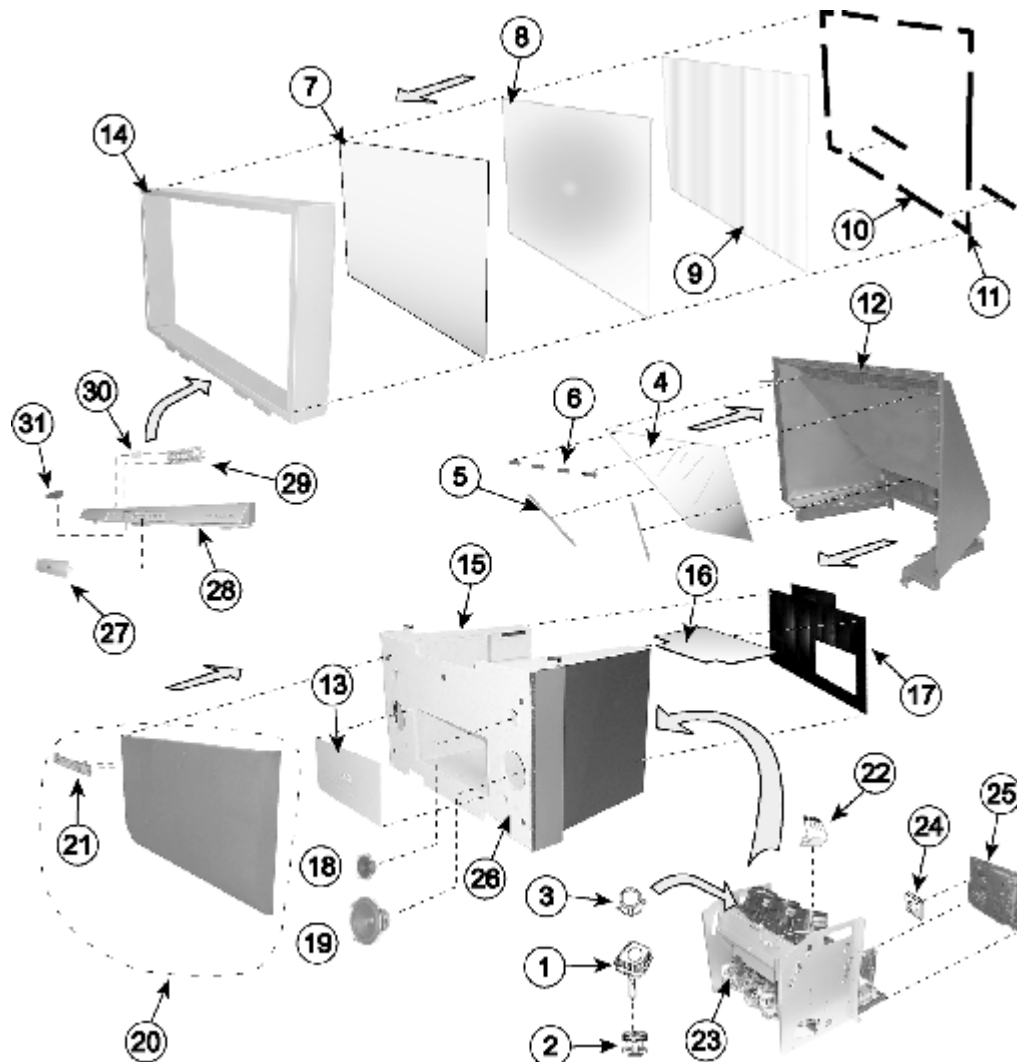
**22.56. T-Board schematic 1 of 2**

**22.57. T-Board schematic 2 of 2**

**22.58. Voltages**

**22.59. Waveforms**


## **23. Parts location**



## **24. Parts list**

### **24.1. Description of abbreviations guide**

### Important Safety Notice

Components identified by  mark have special characteristics important for safety. When replacing any of these components, use manufacturer's specified parts.

### Abbreviation of part name and description

#### 1. Resistor

Example :

ERD25TJ104 C 100KΩ J 1/4W  
Type Allowance

#### 2. Capacitor

Example :

ECKF1H103ZF C 0.01μF Z 50V  
Type Allowance

Type	Allowance
C : Carbon	F : ± 1%
F : Fuse	G : ± 2%
M : Metal Oxide Metal Film	J : ± 5%
	K : ± 10%
S : Solid	M : ± 20%
W : Wire Wound	

Type	Allowance
C : Carbon	C : ± 0.25pF
E : Electrolytic	D : ± 0.5pF
P : Polyester Polypropylene	F : ± 1pF
	G : ± 3pF
T : Tantalum	J : ± 5%
	K : ± 10%
	L : ± 15%
	M : ± 20%
	P : ± 100% -40%
	Z : ± 80% -20%

## 24.2. Parts list

Ref. No.	Part No.	Part Name & Description	Remarks
CAPACITORS			
C001	ECEA1CKA470B	CAP E 47UF-16V	
C002	ECJ2VC1H220J	CAP C 22PF-J-50V	
C003	ECJ2VC1H220J	CAP C 22PF-J-50V	
C004	ECEA1HKA4R7B	CAP E 4.7UF-50V	
C005	ECEA1HKA2R2B	CAP E 2.2UF-50V	
C006	EEUFC1A471B	CAP E 470UF-10V	
C011	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C012	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C017	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C021	ECEA1HKAR22B	CAP E .22UF-50V	
C023	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C024	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C026	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C027	ECA1CM101B	CAP E 100UF-16V	
C028	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C051	EEUFC1E470B	CAP E 47UF-25V	
C052	ECKR1H103ZF5	CAP C 1000PF-50V	
C301	F2A2E100A025	CAP E 10UF-250V	
C302	ECCR1H221JC5	CAP C 220PF-J-50V	
C304	ECKW2H103PU8	CAP C .01UF-P-500V	
C305	F2A1H470A162	CAP E 47UF-50V	
C306	F2A2E100A025	CAP E 10UF-250V	
C307	ECKR1H103ZF5	CAP C .01UF-Z-50V	

Ref. No.	Part No.	Part Name & Description	Remarks
C312	ECKC3D102KBN	CAP C 1000PF-K-2KV	
C313	ECKR2H102KB5	CAP C 1000PF-K-500V	
C331	F2A1H470A162	CAP E 47UF-50V	
C332	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C333	F2A1H470A162	CAP E 47UF-50V	
C334	F2A2E470A026	CAP E 47UF-250V	
C335	ECCR1H221JC5	CAP C 220PF-J-50V	
C336	F2A1H470A162	CAP E 47UF-50V	
C337	F2A2E470A026	CAP E 47UF-250V	
C339	ECKW2H103PU8	CAP C .01UF-P-500V	
C340	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C341	F2A2E100A025	CAP E 10UF-250V	
C345	ECKC3D102KBN	CAP C 1000PF-K-2KV	
C346	ECKR2H102KB5	CAP C 1000PF-K-500V	
C361	F2A1C101A159	CAP E 100UF-16V	
C362	ECCR1H221JC5	CAP C 220PF-J-50V	
C364	ECKW2H103PU8	CAP C .01UF-P-500V	
C365	F2A2E100A025	CAP E 10UF-250V	
C366	F2A1H470A162	CAP E 47UF-50V	
C367	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C372	ECKC3D102KBN	CAP C 1000PF-K-2KV	
C373	ECKR2H102KB5	CAP C 1000PF-K-500V	
C374	F2A1C101A159	CAP E 100UF-16V	
C405	ECA1EHG102E	CAP E 1000UF-25V	
C406	ECA1EHG102E	CAP E 1000UF-25V	
C407	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C408	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C411	TCJ2VB1H822K	CAP C 8200PF-K-50V	
C412	ECQB1224KF3	CAP P .22UF-K-100V	
C413	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C414	TCJ2VB1H272K	CAP C 2700PF-K-50V	
C417	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C418	TCJ2VF1H223Z	CAP C .022UF-Z-50V	
C421	ECEA1CN220UB	CAP E 22UF-16V	
C458	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C461	ECA1HHG221B	CAP E 220UF-50V	
C501	ECA1EM101B	CAP E 100UF-25V	
C502	ECQV1H105JL3	CAP P 1.0UF-J-50V	
C503	ECKR2H102KB5	CAP C 1000PF-K-500V	
C509	ECWF2474JSR	CAP P .47UF-J-200V	
C510	TCJ2VC1H221J	CAP C 220PF-J-50V	
C511	ECWH20222JVY	CAP P 2200PF-J-2KV	⚠
C512	ECWH20102JVY	CAP P 1000PF-J-2KV	⚠
C513	ECQF4103JZH	CAP P .01UF-J-400V	⚠
C514	ECWH20222JVY	CAP P 2200PF-J-2KV	⚠
C518	ECKW3D221JBP	CAP C 220PF-J-2KVDC	⚠
C519	ECKW3D221JBP	CAP C 220PF-J-2KVDC	⚠
C520	ECQB1H103JF3	CAP P .01UF-J-50V	⚠
C522	ECWH20182JVY	CAP P 1800PF-J-2KV	⚠
C523	ECWH20182JVY	CAP P 1800PF-J-2KV	⚠
C524	ECQB1224JF3	CAP P .22UF-J-100V	
C525	ECEA1HN220UB	CAP E 22UF-50V	

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Ref. No.	Part No.	Part Name & Description	Remarks
C526	ECA2EM101E	CAP E 100UF-250V	
C527	ECKR2H102KB5	CAP C 1000PF-K-500V	
C528	ECA1HM470B	CAP E 47UF-50V	⚠
C531	ECA160V33UE	CAP E 33UF-160V	
C533	ECKR2H101KB5	CAP C 100UF-K-500V	
C535	ECA1EM471E	CAP E 470UF-25V	
C601	EEUFC1C331B	CAP E 330UF-16V	
C602	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C701	ECA1CM101B	CAP E 100UF-16V	
C702	ECKW3D271KBP	CAP C 270PF-K-2KV	
C703	ECQM2104KZW	CAP P .1UF-K-200V	
C704	ECKR2H391KB5	CAP C 390PF-K-500V	
C707	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C708	ECQE1685KFB	CAP P 6.8UF-K-100V	
C801	ECQU2A104MNB	CAP P .10UF-M-250VAC	⚠
C802	ECQU2A823MNB	CAP P .082UF-M-250V	⚠
C803	ECKCNA222ME7	CAP C 2200PF-M-125V	⚠
C804	ECKCNA222ME7	CAP C 2200PF-M-125V	⚠
C805	ECKW2H472PU7	CAP C 4700PF-P-500V	⚠
C806	ECKW2H472PU7	CAP C 4700PF-P-500V	⚠
C807	ECKW2H472PU7	CAP C 4700PF-P-500V	⚠
C808	ECA1EM101B	CAP E 100UF-25V	
C809	TCJ2VB1E223K	CAP C .022UF-K-25V	
C810	EETED2D102C	CAP E 1000PF-200V	⚠
C812	ECA1EHG471B	CAP E 470UF-25V	
C814	ECKW3D102KBP	CAP C 1000PF-K-2KV	
C815	ECQB1H152JF3	CAP P 1500PF-J-50V	
C816	ECKW3D821KBP	CAP C 820PF-K-2KV	
C817	ECKW3D102KBP	CAP C 1000PF-K-2KV	
C819	ECQB1H102JF3	CAP P 1000PF-J-50V	
C820	ECQV1H334JL3	CAP P .33UF-J-50V	
C821	ECQB1H272KF3	CAP P 2700PF-K-50V	
C822	ECA1HM220B	CAP E 22UF-50V	
C823	TCJ2VC1H151J	CAP C 150PF-J-50V	
C824	EEUFC1V151B	CAP E 150UF-35V	
C825	ECKCNA102MBB	CAP C .001UF-M-125V	⚠
C826	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C830	EETHC2C471B	CAP E 470PF-160V	⚠
C831	ECKW3D821KBP	CAP C 820PF-K-2KV	
C832	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C834	EEUFC1V222E	CAP E 2200UF-35V	
C836	ECKR3A331KBP	CAP C 330PF-K-1KVDC	
C837	ECA1EM472E	CAP E 4700UF-25V	
C839	ECKR3A331KBP	CAP C 330PF-K-1KVDC	
C841	ECA1EM472E	CAP E 4700UF-25V	
C842	ECKR3A331KBP	CAP C 330PF-K-1KVDC	
C843	ECA1VM222E	CAP E 2200UF-35V	
C844	ECKR3A331KBP	CAP C 330PF-K-1KVDC	
C845	ECA1VM222E	CAP E 2200UF-35V	
C846	ECKR3A331KBP	CAP C 330PF-K-1KVDC	
C848	ECA1CM101B	CAP E 100UF-16V	

Ref. No.	Part No.	Part Name & Description	Remarks
C849	ECKR1H223ZF5	CAP C .022UF-Z-50V	
C851	ECQV1H104JL3	CAP P .10UF-J-50V	
C852	ECA1EM101B	CAP E 100UF-25V	
C854	ECA1CM101B	CAP E 100UF-16V	
C855	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C860	EEUFC1V561E	CAP E 560UF-35V	
C861	ECJ3VF1H224Z	CAP C .22UF-Z-50V	
C863	EEUFC1A102B	CAP E 1000UF-10V	
C863	EEUFC1C471LB	CAP E 470UF-16V	
C864	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C865	ECA0JM102B	CAP E 1000UF-6.3V	
C865	ECA1CM221B	CAP E 10UF-16V	
C866	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C874	ECA1CM101B	CAP E 100UF-16V	
C876	ECJ3VF1H224Z	CAP C .22UF-Z-50V	
C877	ECA1CM221B	CAP E 10UF-16V	
C878	EEUFC1V561E	CAP E 560UF-35V	
C879	EEUFC1C471LB	CAP E 470UF-16V	
C880	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C881	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C882	ECA1CM221B	CAP E 10UF-16V	
C883	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C885	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C886	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C887	EEUFC1V561E	CAP E 560UF-35V	
C888	EEUFC1V561E	CAP E 560UF-35V	
C889	ECJ2YF1E474Z	CAP C .47UF-Z-25V	
C890	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C891	EEUFC1C471LB	CAP E 470UF-16V	
C892	ECA1CM221B	CAP E 10UF-16V	
C893	EEUFC1C471LB	CAP E 470UF-16V	
C895	ECJ3VF1H224Z	CAP C .22UF-Z-50V	
C896	ECJ3VF1H224Z	CAP C .22UF-Z-50V	
C897	ECJ2VB1H152K	CAP C .0015UF-K-50V	
C902	ECQM2103KZB	CAP P .01UF-K-200V	
C903	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C904	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C906	ECQM2103KZB	CAP P .01UF-K-200V	
C907	F2A2C100A023	CAP E 10UF-160V	
C908	F2A1C101A159	CAP E 100UF-16V	
C909	F2A1C101A159	CAP E 100UF-16V	
C910	F2A2C100A023	CAP E 10UF-160V	
C912	F2A1H220A162	CAP E 22UF-50V	
C931	ECA1HM101B	CAP E 100UF-50V	
C932	ECJ2VB1H103K	CAP C .01UF-K-50V	
C933	ECA1CM101B	CAP E 100UF-16V	
C935	ECJ2VB1H102K	CAP C .001UF-K-50V	
C936	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C939	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C940	ECQM2103KZB	CAP P .01UF-K-200V	
C941	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C942	ECQM2103KZB	CAP P .01UF-K-200V	
C943	F2A2C100A023	CAP E 10UF-160V	
C944	F2A1C101A159	CAP E 100UF-16V	

Ref. No.	Part No.	Part Name & Description	Remarks
C945	F2A1C101A159	CAP E 100UF-16V	
C947	F2A2C100A023	CAP E 10UF-160V	
C962	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C963	ECQM2103KZB	CAP P .01UF-K-200V	
C965	ECKR1H103ZF5	CAP C .01UF-Z-50V	
C966	ECQM2103KZB	CAP P .01UF-K-200V	
C967	F2A2C100A023	CAP E 10UF-160V	
C968	F2A1C101A159	CAP E 100UF-16V	
C969	F2A1C101A159	CAP E 100UF-16V	
C970	F2A2C100A023	CAP E 10UF-160V	
C972	F2A1H220A162	CAP E 22UF-50V	
C1502	ECQE6104KFB	CAP P 100UF-K-100V	
C1503	ECQE6104KFB	CAP P 100UF-K-100V	
C1504	ECJ2VB1C104K	CAP C .1UF-K-16V	
C1505	ECA1CM101B	CAP E 100UF-16V	
C1506	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C1507	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C1508	ECA1CM101B	CAP E 100UF-16V	
C1509	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C1510	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C1511	TCJ2VC1H471J	CAP C 470PF-J-50V	
C1513	ECEA1EN101UB	CAP E 100UF-25V	
C1514	ECA1CM101B	CAP E 100UF-16V	
C2213	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C2214	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C2220	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2221	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2222	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2223	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2224	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2225	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2226	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2227	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2228	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2229	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2230	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2234	ECA1CM101B	CAP E 100UF-16V	
C2236	ECA0JM222B	CAP E 2200UF-6.3V	
C2236	ECA1CM101B	CAP E 100UF-16V	
C2238	ECA1CM101B	CAP E 100UF-16V	
C2239	ECA1CM101B	CAP E 100UF-16V	
C2303	ECA1VM101B	CAP E 100UF-35V	
C2304	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C2320	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2321	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2324	ECA1CM101B	CAP E 100UF-16V	
C2326	ECA0JM332B	CAP E 3300PF-6.3V	
C2326	ECA1CM101B	CAP E 100UF-16V	
C2330	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2332	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2333	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2334	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C2335	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2337	ECA50YT2R2KB	CAP E 2.2UF-50V	

Ref. No.	Part No.	Part Name & Description	Remarks
C2338	ECA50YT2R2KB	CAP E 2.2UF-50V	
C2342	ECJ2VB1H333K	CAP C .033UF-K-50V	
C2344	ECQB1H224JF3	CAP P .22UF-J-50V	
C2345	EEUFC1E222E	CAP E 2200UF-25V	
C2346	ECJ2VB1H561K	CAP C 560PF-K-50V	
C2347	ECJ3VB1H104K	CAP C .1UF-K-50V	
C2351	F1J1C225A083	CAP C 2.2UF-Z-16V	
C2352	EEUFC1E222E	CAP E 2200UF-25V	
C2354	ECJ2VB1H471K	CAP C 470PF-K-50V	
C2355	ECJ2VC1H270J	CAP C 27PF-J-50V	
C2356	ECJ2VB1H471K	CAP C 470PF-K-50V	
C2357	ECJ2VB1H331K	CAP C 330PF-K-50V	
C2358	ECJ3VB1H104K	CAP C .1UF-K-50V	
C2359	ECJ2VB1H331K	CAP C 330PF-K-50V	
C2360	ECJ3VB1H104K	CAP C .1UF-K-50V	
C2361	ECJ2VB1H471K	CAP C 470PF-K-50V	
C2362	ECJ2VB1H471K	CAP C 470PF-K-50V	
C2363	ECJ2VB1H682K	CAP C .0068UF-K-50V	
C2364	ECJ3VB1H104K	CAP C .1UF-K-50V	
C2365	ECJ3VB1H104K	CAP C .1UF-K-50V	
C2367	ECQB1H224JF3	CAP P .22UF-J-50V	
C2368	ECJ2VB1H333K	CAP C .033UF-K-50V	
C2369	ECJ2VB1H561K	CAP C 560PF-K-50V	
C2370	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2371	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2373	ECJ2VB1H682K	CAP C .0068UF-K-50V	
C2374	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2375	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2389	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C2390	ECJ2VF1H103Z	CAP C .01UF-Z-50V	
C2451	ECEA1HN4R7UB	CAP E 4.7UF-50V	
C2452	ECEA1HN4R7UB	CAP E 4.7UF-50V	
C2453	ECJ2VB1H332K	CAP C .0033UF-K-50V	
C2454	ECJ2VB1H332K	CAP C .0033UF-K-50V	
C2455	ECJ2VB1H333K	CAP C .033UF-K-50V	
C2456	ECJ2VB1H333K	CAP C .033UF-K-50V	
C2457	ECQB1H222JF3	CAP P 2200PF-J-50V	
C2458	ECQB1H222JF3	CAP P 2200PF-J-50V	
C2459	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2459	ECJ2VB1C224K	CAP C .22UF-K-16V	
C2460	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2460	ECJ2VB1C224K	CAP C .22UF-K-16V	
C2461	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C2462	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2463	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2464	ECA1HM4R7B	CAP E 4.7UF-50V	
C2465	ECA1HM4R7B	CAP E 4.7UF-50V	
C2466	ECA1HM4R7B	CAP E 4.7UF-50V	
C2467	ECA1HM4R7B	CAP E 4.7UF-50V	
C2468	ECA1HM4R7B	CAP E 4.7UF-50V	
C2474	ECA1CM101B	CAP E 100UF-16V	
C2475	ECJ2VB1H103K	CAP C .01UF-K-50V	
C2507	ECA1CM101B	CAP E 100UF-16V	
C2587	ECJ2VF1H103Z	CAP C .01UF-Z-50V	




Ref. No.	Part No.	Part Name & Description	Remarks
C2588	ECA1CM102B	CAP E 1000UF-16V	
C2589	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C2599	ECJ2VB1C104K	CAP C .1UF-K-16V	
C2803	ECCR1H470J5	CAP DISC 47-5-50V	
C2804	ECCR1H102J5	CAP C 1000PF-50V	
C2805	ECKW3D471KBP	CAP C 470PF-K-2KVDC	
C2806	ECES2DG101DG	CAP E 100UF-200V	
C2807	ECA1EHG221B	CAP E 220UF-25V	
C2808	ECQE2333JFB	CAP P .033UF-J-200V	
C2809	ECKCNA471MB7	CAP C 470PF	
C2811	ECKR2H471KB5	CAP C 470PF-K-500V	
C2812	ECA1HHG010B	CAP E 1UF-50V	
C2813	ECKR2H471KB5	CAP C 470PF-K-500V	
C2814	EEUFC1C332E	CAP E 3300PF-E-16V	
C2815	ECA1HHG100B	CAP E 10UF/50V	
C2816	EEUFC1C332E	CAP E 3300PF-E-16V	
C2850	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C2851	ECA1CM331B	CAP E 330UF-16V	
C2852	ECA1CM331B	CAP E 330UF-16V	
C2853	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C3003	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3004	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3005	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3006	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3007	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3008	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3009	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3010	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3020	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3021	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3022	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3023	ECJ2VF1C105Z	CAP C 1.0UF-Z-16V	
C3024	ECA1CM471E	CAP E 470UF-16V	
C3031	ECEA1CKA101B	CAP E 100UF-16V	
C3032	ECEA1CKA101B	CAP E 100UF-16V	
C3033	ECA1CM471E	CAP E 470UF-16V	
C3034	ECA1CM471E	CAP E 470UF-16V	
C7001	ECJ3YF1E225Z	CAP C 22MF-Z-25V	
C7002	ECJ3YF1E225Z	CAP C 22MF-Z-25V	
C7004	ECA1EHG221B	CAP E 220UF-25V	
C7006	ECA1EHG221B	CAP E 220UF-25V	
C7015	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C7016	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C7017	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C7018	TCJ2VF1H103Z	CAP C .01UF-Z-50V	
C7032	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C7033	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C7034	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C7035	ECJ2VF1H104Z	CAP C .1UF-Z-50V	
C7060	ECA1CHG101B	CAP E 100UF-16V	
C7061	ECA1CHG101B	CAP E 100UF-16V	
C7150	ECA1VM470B	CAP E 47UF-35V	
C7165	ECA1VM470B	CAP E 47UF-35V	

Ref. No.	Part No.	Part Name & Description	Remarks
DIODES			
D002	MAZ31500ML	DIODE ZENER	
D003	MAZ41500MF	DIODE ZENER	
D004	MAZ31500ML	DIODE ZENER	
D005	MAZ41500MF	DIODE ZENER	
D081	LN21RCPHL	DIODE	
D082	MAZ40560MF	DIODE ZENER	
D083	MAZ40560MF	DIODE ZENER	
D301	MA2C16700E	DIODE	
D302	MAZ41000LF	DIODE ZENER	
D303	TVSRM1V1	DIODE	
D304	D1NL40V70	DIODE	
D306	MA2C165001VT	DIODE	
D307	MA2C165001VT	DIODE	
D312	MA2C18800E	DIODE	
D313	MA2C18800E	DIODE	
D314	MA2C18800E	DIODE	
D315	MA2C18800E	DIODE	
D331	D1NL40V70	DIODE	
D334	MA2C165001VT	DIODE	
D335	MA2C165001VT	DIODE	
D339	MA2C18800E	DIODE	
D340	MA2C18800E	DIODE	
D341	MA2C18800E	DIODE	
D342	MA2C18800E	DIODE	
D361	D1NL40V70	DIODE	
D363	MA2C165001VT	DIODE	
D364	MA2C165001VT	DIODE	
D369	MA2C18800E	DIODE	
D370	MA2C18800E	DIODE	
D371	MA2C18800E	DIODE	
D372	MA2C18800E	DIODE	
D407	MA3X152K0L	DIODE	
D409	MA3X152K0L	DIODE	
D410	MA3X152K0L	DIODE	
D411	MA3X152K0L	DIODE	
D451	B0EAKC000003	DIODE RECTIFIER	
D452	B0EAKC000003	DIODE RECTIFIER	
D453	B0EAKC000003	DIODE RECTIFIER	
D454	B0EAKC000003	DIODE RECTIFIER	
D455	B0EAKC000003	DIODE RECTIFIER	
D456	B0EAKC000003	DIODE RECTIFIER	
D458	B0EAKL000008	DIODE RECTIFIER	
D465	MAZ40390MF	DIODE ZENER	
D466	MA3X152K0L	DIODE	
D501	D1NL40V70	DIODE	
D502	MAZ31500ML	DIODE ZENER	
D503	B0HBRV000001	DIODE	
D504	MAZ42700MF	DIODE ZENER	
D509	MA2C165001VT	DIODE	
D510	MAZ40680LF	DIODE ZENER	
D511	B0HAHP000014	DIODE	
D512	D1NL40V70	DIODE	
D513	MA2C165001VT	DIODE	

Ref. No.	Part No.	Part Name & Description	Remarks
D515	D1NL40V70	DIODE	
D516	EU2YXV0	DIODE	
D519	AU02ZV0	DIODE	
D520	MA3X152K0L	DIODE	
D634	MA2C165001VT	DIODE	
D650	MAZ41100MF	DIODE ZENER	
D651	MAZ41100MF	DIODE ZENER	
D656	MAZ41100MF	DIODE ZENER	
D657	MAZ41100MF	DIODE ZENER	
D659	MAZ41100MF	DIODE ZENER	
D660	MAZ41100MF	DIODE ZENER	
D662	MAZ41100MF	DIODE ZENER	
D663	MAZ41100MF	DIODE ZENER	
D702	D1NL40V70	DIODE	
D801	D3SB80-4101	DIODE	
D802	ERZC10VK361G	VARISTOR	
D815	MA2C165001VT	DIODE	
D816	MA2C70000F	DIODE	
D817	AU01ZV0	DIODE	
D818	MAZ32700LL	DIODE ZENER	
D819	B0BA01000046	DIODE ZENER	
D822	B0AAGM000006	DIODE SWITCHING	
D825	SF5L60U-4115	DIODE GERMANIUM	
D827	SF5LC30-4115	DIODE GERMANIUM	
D828	SF5LC30-4115	DIODE GERMANIUM	
D829	SF5LC30-4115	DIODE GERMANIUM	
D830	RL4ZLF-J6	DIODE	
D831	RL4ZLF-J6	DIODE	
D835	B0JAME000052	DIODE	
D837	MA3X152K0L	DIODE	
D870	B0JCME000025	DIODE	
D871	B0JCME000025	DIODE	
D876	B0JCME000025	DIODE	
D885	MA2062-BTP	DIODE	
D886	MA2120-ATP	DIODE	
D887	MA2062-BTP	DIODE	
D890	B0JCME000025	DIODE	
D891	MA2062-BTP	DIODE	
D895	MA2C165001VT	DIODE	
D896	MA3X152K0L	DIODE	
D902	MA2C18800E	DIODE	
D933	MA2C18800E	DIODE	
D953	B0ZAZ0000047	DIODE	
D962	MA2C18800E	DIODE	
D973	B0ZAZ0000047	DIODE	
D983	B0ZAZ0000047	DIODE	
D1502	B0HACW000001	DIODE	
D1503	MAZ30300LL	DIODE ZENER	
D1504	B0HACW000001	DIODE	
D1505	MA2C0290BF	DIODE	
D1506	MAZ30510HL	DIODE	
D1507	MAZ30300LL	DIODE ZENER	

Ref. No.	Part No.	Part Name & Description	Remarks
D1510	MAZ30330LL	DIODE ZENER	
D1599	MA3X152K0L	DIODE	
D2321	MA3X152K0L	DIODE	
D2323	MA3X152K0L	DIODE	
D2324	MA3X152K0L	DIODE	
D2802	B0EBKT000003	DIODE	
D2806	MAZ41100MF	DIODE ZENER	
D2809	MA2C165001VT	DIODE	
D2810	EG01AF7	DIODE	
D2811	AG01ZV0	DIODE	
D2813	B0HBSM000034	DIODE	
D2814	AG01ZV0	DIODE	
D2815	MA3X152K0L	DIODE	
D2816	MAZ31500ML	DIODE ZENER	
D3001	MAZ31100ML	DIODE ZENER	
D3002	MAZ31100ML	DIODE ZENER	
D3003	MAZ31100ML	DIODE ZENER	
D3004	MAZ31100ML	DIODE ZENER	
D3005	MAZ31100ML	DIODE ZENER	
D3006	MAZ31100ML	DIODE ZENER	
D3007	MAZ31100ML	DIODE ZENER	
D3008	MAZ31100ML	DIODE ZENER	
D3009	MAZ31100ML	DIODE ZENER	
D3010	MAZ31100ML	DIODE ZENER	
D3011	MAZ31100ML	DIODE ZENER	
D3012	MAZ31100ML	DIODE ZENER	
D3013	MAZ31100ML	DIODE ZENER	
D3014	MAZ31100ML	DIODE ZENER	
D3015	MAZ31100ML	DIODE ZENER	
D3016	MAZ31100ML	DIODE ZENER	
D3017	MAZ31100ML	DIODE ZENER	
D3018	MAZ31100ML	DIODE ZENER	
D3019	MAZ31100ML	DIODE ZENER	
D3020	MAZ31100ML	DIODE ZENER	
D3030	MAZ31100ML	DIODE ZENER	
D3031	MAZ31100ML	DIODE ZENER	
D3035	MAZ31100ML	DIODE ZENER	
D3036	MAZ31100ML	DIODE ZENER	
D3037	MAZ30330LL	DIODE ZENER	
D7060	MA3X152K0L	DIODE	
FUSES			
F801	K5D632AD0002	FUSE 6.3A/125V	
INTEGRATED CIRCUITS			
IC451	C1AA00000521	VERTICAL OUTPUT	
IC701	AN6914S	EW, HHS ADJ. OP-AMP	
IC801	AN8029	POWER SUPPLY	
IC802	C0EAS0000025	MAIN REGULATOR	
IC805	AN78M12LB	12V REGULATOR	
IC811	ON3171RLF	OPTO COUPLER	
IC871	C0DAAZH00009	5V REGULATOR	
IC872	SI-8090J	9V REGULATOR	
IC873	C0DAAZH00009	2.5V REGULATOR	
IC874	C0DAAZH00009	5V REGULATOR	

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Ref. No.	Part No.	Part Name & Description	Remarks
IC880	AN78N12-LB	12V REGULATOR	
IC1101	TVR2AJ173S	MAIN EEPROM	
IC1112	TVR2AJ174S	CONVERGENCE EEPROM	
IC1501	AN6562S-E1	EHT ADJ. OP-AMP	
IC2302	C1AA00000645	AUDIO AMPLIFIER	
IC2451	NJW1137MPTE1	BBE VIVA PROCESSOR	
IC2801	C0DACZH00003	20V REGULATOR (HOT)	
IC2803	AN1431T-TA	SCR	
IC2804	0N3171RLF	OPTO COUPLER	
IC2851	C0CAADH00003	7.7V REGULATOR	
IC7001	C5AA00000108	CONVERGENCE AMPLIFIER	
IC7002	C5AA00000108	CONVERGENCE AMPLIFIER	
COILS			
L002	ELJPA330KF	CHIP INDUCTOR 33UH	
L003	ELJPA100KF	CHIP INDUCTOR 10UH	
L006	ELJPA100KF	CHIP INDUCTOR 10UH	
L301	ELEBD101KA	COIL 100UH	
L302	ELESN100JA	COIL PEAKING 10UH	
L303	ELESN6R8JA	COIL PEAKING 6.8UH	
L304	ELESN4R7JA	RADIAL INDUCTOR	
L331	ELESN100JA	COIL PEAKING 10UH	
L332	ELESN6R8JA	COIL PEAKING 6.8UH	
L333	G0C560KA0021	COIL PEAKING 56UH	
L334	ELESN4R7KA	COIL PEAKING 4.7UH	
L335	ELEBD101KA	COIL 100UH	
L337	G0C560KA0021	COIL PEAKING 56UH	
L361	ELEBD101KA	COIL 100UH	
L362	ELESN100JA	COIL PEAKING 10UH	
L363	ELESN150JA	COIL PEAKING 15UH	
L364	ELESN4R7JA	RADIAL INDUCTOR	
L500	TALL08TR82	MASTER COIL	
L501	EXCELSA35T	FERRITE BEAD	
L510	EXCELD25V	FERRITE BEAD	
L511	EXCELD25V	FERRITE BEAD	
L515	EXCELD25V	FERRITE BEAD	
L516	EXCELD25V	FERRITE BEAD	
L555	ELH5L718	COIL	
L701	ELESN100KA	COIL PEAKING 10UH	
L702	EXCELSA35T	FERRITE BEAD	
L703	ELC18B152L	FILTER	
L704	ELC18B151G	FILTER	
L801	ELF18D650M	COIL	
L802	ELF21N035A	LINE FILTER	
L805	EXCELD25V	FERRITE BEAD	
L806	EXCELD25V	FERRITE BEAD	
L808	EXCELD35V	FERRITE BEAD	
L810	EXCELD25V	FERRITE BEAD	
L811	EXCELD25V	FERRITE BEAD	
L815	EXCELSA39E	FERRITE BEAD	
L816	EXCELSA39E	FERRITE BEAD	
L817	TALL08T680KA	COIL	
L819	EXCELD35V	FERRITE BEAD	
L820	EXCELD35V	FERRITE BEAD	

Ref. No.	Part No.	Part Name & Description	Remarks
L821	EXCELD35V	FERRITE BEAD	
L825	TALL08T330KA	COIL	
L826	TALL08T330KA	COIL	
L827	TALL08T330KA	COIL	
L851	TALL08T470KA	COIL	
L852	G0ZZ00001909	INT CKT	
L853	TALL08T220KA	COIL	
L854	EXCELD35V	FERRITE BEAD	
L876	G0ZZ00001909	INT CKT	
L879	G0ZZ00001909	INT CKT	
L880	G0ZZ00001909	INT CKT	
L885	TALL08T470KA	COIL	
L886	TALL08T220KA	COIL	
L887	TALL08T220KA	COIL	
L888	TALL08T680KA	COIL	
L889	TALL08T470KA	COIL	
L892	EXCELD35V	FERRITE BEAD	
L893	EXCELD35V	FERRITE BEAD	
L894	EXCELD35V	FERRITE BEAD	
L895	TALL08T220KA	COIL	
L901	EXCELSA35T	FERRITE BEAD	
L902	EXCELSA35T	FERRITE BEAD	
L903	EXCELSA35T	FERRITE BEAD	
L931	TALL08T100KA	COIL	
L933	EXCELSA35T	FERRITE BEAD	
L934	EXCELSA35T	FERRITE BEAD	
L935	EXCELSA35T	FERRITE BEAD	
L961	EXCELSA35T	FERRITE BEAD	
L962	EXCELSA35T	FERRITE BEAD	
L963	EXCELSA35T	FERRITE BEAD	
L1102	EXCELD35V	FERRITE BEAD	
L1103	EXCELD35V	FERRITE BEAD	
L2305	TALL08T330KA	COIL	
L2306	TALL08T330KA	COIL	
L2309	TALL08T100KA	COIL	
L2310	TALL08T100KA	COIL	
L2311	TALL08T100KA	COIL	
L2312	TALL08T100KA	COIL	
L2313	TALL08T100KA	COIL	
L2314	TALL08T100KA	COIL	
L2331	ELC12E390	COIL	
L2332	ELC12E390	COIL	
L2336	G0B800H00001	COIL	
L2337	G0B800H00001	COIL	
L2343	ELJPA100KF	CHIP INDUCTOR 10UH	
L2344	ELJPA100KF	CHIP INDUCTOR 10UH	
L2502	ELJPA100KF	CHIP INDUCTOR 10UH	
L2807	TALL08T330KA	COIL	
TRANSISTORS			
Q025	2SC3311ATA	TRANSISTOR	
Q026	2SD601ARTX	TRANSISTOR	
Q301	2SC1473ATA	TRANSISTOR	
Q302	2SC3526H	TRANSISTOR	
Q303	2SC1473ATA	TRANSISTOR	


Ref. No.	Part No.	Part Name & Description	Remarks
Q331	2SC3526H	TRANSISTOR	
Q353	2SC3942LB	TRANSISTOR	
Q354	B1BAAN000025	TRANSISTOR	
Q355	B1BCAN000004	TRANSISTOR	
Q361	2SC3311ATA	TRANSISTOR	
Q362	2SC3311ATA	TRANSISTOR	
Q363	2SC3526H	TRANSISTOR	
Q364	2SA1309ATA	TRANSISTOR	
Q365	2SC3311ATA	TRANSISTOR	
Q366	2SC3311ATA	TRANSISTOR	
Q368	2SA1309ATA	TRANSISTOR	
Q373	2SC3942LB	TRANSISTOR	
Q374	B1BAAN000025	TRANSISTOR	
Q375	B1BCAN000004	TRANSISTOR	
Q393	2SC3942LB	TRANSISTOR	
Q394	B1BAAN000025	TRANSISTOR	
Q395	B1BCAN000004	TRANSISTOR	
Q406	2SD601ARTX	TRANSISTOR	
Q501	B1CEML000001	TRANSISTOR	
Q509	2SC1473QRTA	TRANSISTOR	
Q510	2SC1473QRTA	TRANSISTOR	
Q512	2SD601ARTX	TRANSISTOR	
Q513	2SD601ARTX	TRANSISTOR	
Q551	B1BAJW000001	TRANSISTOR	
Q606	2SD601ARTX	TRANSISTOR	
Q701	2SK2538000LB	TRANSISTOR	
Q801	2SK2917LB	TRANSISTOR	
Q802	2SD601ARTX	TRANSISTOR	
Q803	2SB709ARTX	TRANSISTOR	
Q854	2SA19610QAHW	TRANSISTOR	
Q901	2SB1321ARA	TRANSISTOR	
Q903	2SA720TA	TRANSISTOR	
Q904	2SD1992ARA	TRANSISTOR	
Q905	2SC1318ATA	TRANSISTOR	
Q906	2SC1318ATA	TRANSISTOR	
Q907	2SA720TA	TRANSISTOR	
Q931	2SC3311ATA	TRANSISTOR	
Q932	2SC3311ATA	TRANSISTOR	
Q933	2SC3311ATA	TRANSISTOR	
Q934	2SA720TA	TRANSISTOR	
Q935	2SC1318ATA	TRANSISTOR	
Q936	2SC1318ATA	TRANSISTOR	
Q937	2SA720TA	TRANSISTOR	
Q938	2SB1321ARA	TRANSISTOR	
Q941	2SD1992ARA	TRANSISTOR	
Q951	2SC3311ATA	TRANSISTOR	
Q952	2SC3311ATA	TRANSISTOR	
Q953	2SC3311ATA	TRANSISTOR	
Q955	2SA1248SRA	TRANSISTOR	
Q956	2SC3116SRA	TRANSISTOR	
Q957	2SA1248SRA	TRANSISTOR	
Q958	2SC3116SRA	TRANSISTOR	
Q959	2SA1248SRA	TRANSISTOR	
Q960	2SC3116SRA	TRANSISTOR	



Ref. No.	Part No.	Part Name & Description	Remarks
Q961	2SB1321ARA	TRANSISTOR	
Q964	2SD1992ARA	TRANSISTOR	
Q965	2SA720TA	TRANSISTOR	
Q966	2SC1318ATA	TRANSISTOR	
Q967	2SC1318ATA	TRANSISTOR	
Q968	2SA720TA	TRANSISTOR	
Q1503	2SA1309ATA	TRANSISTOR	
Q1504	B1BAAV000003	TRANSISTOR	
Q1505	2SC3311ATA	TRANSISTOR	
Q2301	2SB709ARTX	TRANSISTOR	
Q2302	2SB709ARTX	TRANSISTOR	
Q2304	2SD601ARTX	TRANSISTOR	
Q2306	UN2215TX	TRANSISTOR	
Q2307	2SB709ARTX	TRANSISTOR	
Q2451	2SD601ARTX	TRANSISTOR	
Q2452	2SD601ARTX	TRANSISTOR	
Q2501	2SD601ARTX	TRANSISTOR	
Q2502	2SD601ARTX	TRANSISTOR	
Q2503	2SD601ARTX	TRANSISTOR	
Q2504	2SB709ARTX	TRANSISTOR	
Q2505	2SB709ARTX	TRANSISTOR	
Q2506	2SB709ARTX	TRANSISTOR	
Q2507	2SB709ARTX	TRANSISTOR	
Q2508	2SB709ARTX	TRANSISTOR	
Q2509	2SB709ARTX	TRANSISTOR	
Q2510	2SB709ARTX	TRANSISTOR	
Q2516	2SC3311ATA	TRANSISTOR	
Q2517	2SA1309ATA	TRANSISTOR	
Q2522	2SC3311ATA	TRANSISTOR	
Q2525	2SC3311ATA	TRANSISTOR	
Q2528	2SC3311ATA	TRANSISTOR	
Q2801	B1DGGD000001	TRANSISTOR	
Q2802	2SD601ARTX	TRANSISTOR	
Q2803	2SD601ARTX	TRANSISTOR	
Q3001	2SB710ATX	TRANSISTOR	
Q3002	2SD601ARTX	TRANSISTOR	
Q7006	2SD601ARTX	TRANSISTOR	
Q7007	2SD601ARTX	TRANSISTOR	
Q7060	2SB709ARTX	TRANSISTOR	
Q7061	2SD601ARTX	TRANSISTOR	
RELAYS			
RL801	K6B1ADA00010	RELAY	
RL802	K6B1ADA00010	RELAY	
RESISTORS			
R001	ERJ6GEYJ221V	RES M 220-J-1/10W	
R002	ERJ6GEYJ221V	RES M 220-J-1/10W	
R015	ERG1SJ273P	RES M 27K-J-1W	
R023	ERDS2TJ471T	RES C 470-J-1/4W	
R024	ERDS2TJ153T	RES C 15K-J-1/4W	
R025	ERDS2TJ473T	RES C 47K-J-1/4W	
R027	ERJ6GEYJ220V	RES M 22-J-1/10W	
R072	ERDS2TJ101T	RES C 100-J-1/4W	
R073	ERDS2TJ471T	RES C 470-J-1/4W	

Ref. No.	Part No.	Part Name & Description	Remarks
R080	ERDS2TJ222T	RES C 2.2K-J-1/4W	
R081	ERDS2TJ222T	RES C 2.2K-J-1/4W	
R082	ERDS2TJ332T	RES C 3.3K-J-1/4W	
R083	ERDS2TJ512T	RES C 5.1K-J-1/4W	
R084	ERDS2TJ912T	RES C 9.1K-J-1/4W	
R086	ERDS2TJ681T	RES C 680-J-1/4W	
R087	ERDS2TJ331T	RES C 330-J-1/4W	
R088	ERDS2TJ123T	RES C 12K-J-1/4W	
R301	ERDS1FJ394P	RES C 390K-J-1/2W	
R302	ERDS2TJ151T	RES C 150-J-1/4W	
R303	EROS2THF2200	RES M 220-f-1/4w	
R304	ERDS2TJ334T	RES C 330K-J-1/4W	
R305	EROS2THF2200	RES M 220-f-1/4w	
R306	EROS2THF4700	RES M 470-f-1/4w	
R307	ERDS2TJ220T	RES C 22-J-1/4W	
R308	ERDS2TJ334T	RES C 330K-J-1/4W	
R310	ERDS2TJ183T	RES C 18K-J-1/4W	
R311	ERDS2TJ470T	RES C 47-J-1/4W	
R312	ERG7ZJ272	RES M 2.7K-J-7W	
R313	ERDS1FJ103T	RES C 10K-J-1/2w	
R315	ERDS2TJ563T	RES C 56K-J-1/4W	
R316	ERDS2TJ821T	RES C 820-J-1/4W	
R319	ERG12SJ101P	RES M 100-J-1W	
R320	ERDS1FJ330P	RES C 33-J-1/2W	
R321	ERDS1FJ330P	RES C 33-J-1/2W	
R322	ERG12SJ101P	RES M 100-J-1W	
R325	ERDS2TJ473T	RES C 47K-J-1/4W	
R327	ERC12GK331D	RES C 330-K-1/2W	
R328	ERDS1TJ104T	RES C 100K-J-1/2W	
R331	EROS2THF2200	RES M 220-f-1/4w	
R332	ERDS2TJ151T	RES C 150-J-1/4W	
R333	EROS2THF2200	RES M 220-f-1/4w	
R334	ERDS2TJ220T	RES C 22-J-1/4W	
R335	EROS2THF4700	RES M 470-f-1/4w	
R337	ERDS1FJ103T	RES C 10K-J-1/2w	
R345	ERDS2TJ470T	RES C 47-J-1/4W	
R347	ERG7ZJ272	RES M 2.7K-J-7W	
R348	ERDS2TJ563T	RES C 56K-J-1/4W	
R349	ERDS2TJ821T	RES C 820-J-1/4W	
R350	ERG12SJ101P	RES M 100-J-1W	
R351	ERDS1FJ330P	RES C 33-J-1/2W	
R352	ERDS1FJ330P	RES C 33-J-1/2W	
R353	ERG12SJ101P	RES M 100-J-1W	
R354	ERDS2TJ473T	RES C 47K-J-1/4W	
R356	ERC12GK331D	RES C 330-K-1/2W	
R357	ERDS1TJ104T	RES C 100K-J-1/2W	
R361	EROS2THF1302	RES M 13k-f-1/4w	
R362	EROS2THF1002	RES M 10K-F-1/4W	
R363	ERDS2TJ220T	RES C 22-J-1/4W	
R364	ERDS2TJ102T	RES C 1K-J-1/4W	
R365	ERDS2TJ221T	RES C 220-J-1/4W	
R366	ERDS2TJ151T	RES C 150-J-1/4W	
R367	EROS2THF2200	RES M 220-f-1/4w	
R368	EROS2THF2200	RES M 220-f-1/4w	

Ref. No.	Part No.	Part Name & Description	Remarks
R369	ERDS2TJ472T	RES C 4.7K-J-1/4W	
R371	EROS2THF4700	RES M 470-f-1/4w	
R372	EROS2THF82R0	RES M 82.0-f-1/4w	
R374	ERDS1FJ103T	RES C 10K-J-1/2w	
R375	ERDS2TJ470T	RES C 47-J-1/4W	
R376	ERG7ZJ272	RES M 2.7K-J-7W	
R379	ERDS2TJ563T	RES C 56K-J-1/4W	
R380	ERDS2TJ821T	RES C 820-J-1/4W	
R383	ERG12SJ101P	RES M 100-J-1W	
R384	ERDS1FJ330P	RES C 33-J-1/2W	
R385	ERDS1FJ330P	RES C 33-J-1/2W	
R386	ERG12SJ101P	RES M 100-J-1W	
R389	ERDS2TJ473T	RES C 47K-J-1/4W	
R390	ERC12GK331D	RES C 330-K-1/2W	
R391	ERDS1TJ104T	RES C 100K-J-1/2W	
R392	EROS2THF8201	RES M 8.2K-F-1/4W	
R393	EROS2THF8201	RES M 8.2K-F-1/4W	
R394	ERDS2TJ102T	RES C 1K-J-1/4W	
R395	ERDS2TJ221T	RES C 220-J-1/4W	
R396	ERDS2TJ472T	RES C 4.7K-J-1/4W	
R397	EROS2THF1201	RES M 1.2k-f-1/4w	
R398	EROS2THF3300	RES M 330-f-1/4w	
R408	ERJ6GEYJ272V	RES M 2.7K-J-1/10W	
R409	ERDS2TJ563T	RES C 56K-J-1/4W	
R410	ERJ6GEYJ224V	RES M 220K-J-1/10W	
R411	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R412	ERJ6GEYJ682V	RES M 6.8K-J-1/10W	
R415	ERG3FJ331H	RES M 330-J-3W	
R422	ERJ6ENF1800V	RES M 180-F-1/10W	
R423	ERJ6ENF5601V	RES M 5.6K-F-1/10W	
R425	ERDS1FJ1R0T	RES C 1.0-J-1/2W	
R426	ERJ6ENF1502V	RES M 15K-F-1/10W	
R428	ERJ6ENF1002V	RES M 10K-F-1/10W	
R434	ERX12SJ1R8V	RES M 1.8-J-1/2W	
R435	ERX12SJ1R8V	RES M 1.8-J-1/2W	
R464	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R465	ERJ6GEYJ392V	RES M 3.9K-J-1/10W	
R466	ERJ6GEYJ562V	RES M 5.6K-J-1/10W	
R470	ERDS2TJ331T	RES C 330-J-1/4W	
R471	ERDS2TJ331T	RES C 330-J-1/4W	
R472	ERDS2TJ331T	RES C 330-J-1/4W	
R501	ERJ6GEYJ104V	RES M 100K-J-1/10W	
R502	ERJ6GEYJ680V	RES M 68-J-1/10W	
R503	ERG2FJ180H	RES M 18-J-2W	
R504	ERG3FJ271H	RES M 270-J-3W	
R505	ERG1SJ120P	RES M 12-J-1W	
R506	ERX1SJR47P	RES M .47-J-1W	
R512	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R513	ERDS2TJ471T	RES C 470-J-1/4W	
R514	EROS2THF5602	RES M 56K-F-1/4W	
R515	EROS2THF4752	RES M 47.5K-F-1/4W	
R516	ERJ6GEYJ101V	RES M 100-J-1/10W	
R517	ERDS2TJ103T	RES C 10K-J-1/4W	
R518	ERX12SJR22V	RES M .22-J-1/2W	

Ref. No.	Part No.	Part Name & Description	Remarks
R519	ERQ12HKR22P	RES F .22-K-1/2W	
R520	ERQ12HJ330P	RES F 33-J-1/2W	
R521	EROS2THF2702	RES M 27k-f-1/4w	
R522	EROS2THF7681	RES M 7.68k-f-1/4w	
R523	ERDS2TJ275T	RES C 2.7MEG-J-1/4W	
R525	ERJ6GEYJ152V	RES M 1.5K-J-1/10W	
R534	EROS2THF1203	RES M 120K-F-1/4W	
R535	ERDS2TJ392T	RES C 3.9K-J-1/4W	
R541	ERDS2TJ563T	RES C 56K-J-1/4W	
R550	EROS2THF1002	RES M 10K-F-1/4W	
R560	ERJ6GEYJ101V	RES M 100-J-1/10W	
R561	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R562	ERJ6GEYJ104V	RES M 100K-J-1/10W	
R621	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R622	ERJ6GEYJ152V	RES M 1.5K-J-1/10W	
R624	ERJ6GEYJ101V	RES M 100-J-1/10W	
R643	ERJ6GEYJ101V	RES M 100-J-1/10W	
R653	ERDS2TJ101T	RES C 100-J-1/4W	
R654	ERDS2TJ184T	RES C 180K-J-1/4W	
R655	ERDS2TJ184T	RES C 180K-J-1/4W	
R704	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R706	ERDS1FJ680T	RES C 68-J-1/2W	
R708	ERF5AK4R7H	RES W 4.7-K-5W	
R805	ERDS2TJ101T	RES C 100-J-1/4W	
R808	ERX12SZJR12P	RES M .12-J-1/2W	
R809	ERJ6GEYJ225V	RES M 2.2M-J-1/10W	
R810	ERX12SZJR12P	RES M .12-J-1/2W	
R811	ERX12SZJR12P	RES M .12-J-1/2W	
R812	ERDS2TJ103T	RES C 10K-J-1/4W	
R813	ERDS1FJ561T	RES C 560-J-1/2W	
R814	ERDS2TJ4R7T	RES C 4.7-J-1/4W	
R815	ERJ6GEYJ301V	RES M 300-J-1/10W	
R816	ERDS2TJ471T	RES C 470-J-1/4W	
R817	ERJ6ENF2001V	RES M 2K-F-1/10W	
R818	ERDS1FJ100T	RES C 10-J-1/2W	
R820	ERDS1FJ470T	RES C 47-J-1/2W	
R822	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R832	ERD75TAJ825	RES C 8.2MEG-J-3/4W	
R833	ERJ6GEYJ101V	RES M 100-J-1/10W	
R835	ERDS2TJ101T	RES C 100-J-1/4W	
R836	ERJ6GEYJ101V	RES M 100-J-1/10W	
R839	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R840	ERJ6GEYJ101V	RES M 100-J-1/10W	
R846	ERDS2TJ223T	RES C 22K-J-1/4W	
R847	ERDS2TJ272T	RES C 2.7K-J-1/4W	
R857	ERX1SJ1R0P	RES M 1.0-J-1W	
R858	ERX1SJ1R0P	RES M 1.0-J-1W	
R859	ERDS2TJ103T	RES C 10K-J-1/4W	
R860	ERDS1FJ222T	RES C 2200-J-1/2W	
R862	ERG3FJ333H	RES M 33K-J-3W	
R863	ERJ6ENF3001V	RES M 3K-F-1/10W	
R865	ERJ6GEYJ153V	RES M 15K-J-1/10W	
R866	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	

Ref. No.	Part No.	Part Name & Description	Remarks
R867	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R888	ERJ6ENF1001V	RES M 1K-F-1/10W	
R889	ERJ6ENF1001V	RES M 1K-F-1/10W	
R893	ERJ6ENF1001V	RES M 1K-F-1/10W	
R895	ERJ6GEYJ100V	RES M 10-J-1/10W	
R896	ERJ6ENF1001V	RES M 1K-F-1/10W	
R897	ERJ6ENF3001V	RES M 3K-F-1/10W	
R901	ERDS2FJ122T	RES C 1.2K-J-1/2W	
R902	ERDS2TJ103T	RES C 10K-J-1/4W	
R903	ERDS2TJ683T	RES C 68K-J-1/4W	
R904	ERDS2TJ683T	RES C 68K-J-1/4W	
R905	ERDS2TJ103T	RES C 10K-J-1/4W	
R906	ERDS2TJ122T	RES C 1.2K-J-1/4W	
R907	ERDS1FVJ390T	RES C 39-J-1/2W	
R908	ERDS1FVJ390T	RES C 39-J-1/2W	
R909	ERDS1FVJ8R2T	RES C 8.2-J-1/2W	
R910	ERDS2TJ8R2T	RES C 8.2-J-1/4W	
R911	ERG3SJS221H	RES M 220-J-3W	
R912	ERDS2TJ681T	RES C 680-J-1/4W	
R913	ERDS1FVJ152T	RES C 1.5K-J-1/2W	
R914	ERDS1FVJ152T	RES C 1.5K-J-1/2W	
R915	ERQ14AJ220P	RES F 22-J-1/4W	
R916	ERQ14AJ220P	RES F 22-J-1/4W	
R917	ERQ14AJ100P	RES F 10-J-1/4W	
R925	ERDS2TJ151T	RES C 150-J-1/4W	
R926	ERDS2TJ151T	RES C 150-J-1/4W	
R928	ERQ14AJ220P	RES F 22-J-1/4W	
R929	ERDS2TJ101T	RES C 100-J-1/4W	
R930	ERJ6GEYJ100V	RES M 10-J-1/10W	
R930	ERJ6GEYJ330V	RES M 33-J-1/10W	
R931	ERJ6GEYJ101V	RES M 100-J-1/10W	
R932	ERJ6GEYJ273V	RES M 27K-J-1/10W	
R933	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R934	ERJ6GEYJ153V	RES M 15K-J-1/10W	
R935	ERJ6GEYJ822V	RES M 8.2K-J-1/10W	
R936	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R937	ERJ6GEYJ471V	RES M 470-J-1/10W	
R938	ERJ6GEYJ391V	RES M 390-J-1/10W	
R939	ERJ6GEYJ470V	RES M 47-J-1/10W	
R942	ERDS1FVJ152T	RES C 1.5K-J-1/2W	
R943	ERDS1FVJ152T	RES C 1.5K-J-1/2W	
R944	ERDS2TJ471T	RES C 470-J-1/4W	
R945	ERDS2TJ471T	RES C 470-J-1/4W	
R946	ERQ14AJ100P	RES F 10-J-1/4W	
R947	ERQ14AJ220P	RES F 22-J-1/4W	
R948	ERDS2FJ122T	RES C 1.2K-J-1/2W	
R949	ERDS2TJ103T	RES C 10K-J-1/4W	
R950	ERDS2TJ683T	RES C 68K-J-1/4W	
R951	ERDS2TJ683T	RES C 68K-J-1/4W	
R952	ERDS2TJ103T	RES C 10K-J-1/4W	
R953	ERDS2TJ122T	RES C 1.2K-J-1/4W	
R954	ERDS1FVJ390T	RES C 39-J-1/2W	
R955	ERDS1FVJ390T	RES C 39-J-1/2W	
R956	ERDS1FVJ8R2T	RES C 8.2-J-1/2W	

Ref. No.	Part No.	Part Name & Description	Remarks
R957	ERDS2TJ8R2T	RES C 8.2-J-1/4W	
R958	ERG3SJS221H	RES M 220-J-3W	
R959	ERDS2TJ471T	RES C 470-J-1/4W	
R961	ERDS2FJ122T	RES C 1.2K-J-1/2W	
R962	ERDS2TJ103T	RES C 10K-J-1/4W	
R963	ERDS2TJ683T	RES C 68K-J-1/4W	
R964	ERDS2TJ683T	RES C 68K-J-1/4W	
R965	ERDS2TJ103T	RES C 10K-J-1/4W	
R966	ERDS2TJ122T	RES C 1.2K-J-1/4W	
R967	ERDS1FVJ390T	RES C 39-J-1/2W	
R968	ERDS1FVJ390T	RES C 39-J-1/2W	
R969	ERDS1FVJ8R2T	RES C 8.2-J-1/2W	
R970	ERDS2TJ8R2T	RES C 8.2-J-1/4W	
R971	ERG3SJS221H	RES M 220-J-3W	
R972	ERDS2TJ681T	RES C 680-J-1/4W	
R973	ERDS1FVJ152T	RES C 1.5K-J-1/2W	
R974	ERDS1FVJ152T	RES C 1.5K-J-1/2W	
R975	ERQ14AJ100P	RES F 10-J-1/4W	
R976	ERQ14AJ220P	RES F 22-J-1/4W	
R978	ERQ14AJ220P	RES F 22-J-1/4W	
R1502	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R1503	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R1504	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R1505	ERDS2TJ102T	RES C 1K-J-1/4W	
R1506	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R1507	ERG3SJD152L	RES M 1.5K-J-3W	
R1508	ERJ6GEYJ152V	RES M 1.5K-J-1/10W	
R1509	ERDS2TJ102T	RES C 1K-J-1/4W	
R1510	ERG2SJD333L	RES M 33K-J-2W	
R1511	ERG2SJD333L	RES M 33K-J-2W	
R1512	ERJ6ENF2201V	RES M 2.2K-F-1/10W	
R1514	ERG2SJD333L	RES M 33K-J-2W	
R1515	ERJ6ENF1001V	RES M 1K-F-1/10W	
R1516	ERJ6GEYJ101V	RES M 100-J-1/10W	
R1517	ERJ6ENF3571V	RES M 3.57K-F-1/10W	
R1518	ERG2SJD333L	RES M 33K-J-2W	
R1519	ERDS2TJ101T	RES C 100-J-1/4W	
R1520	ERDS2TJ221T	RES C 220-J-1/4W	
R1521	EROS2THF1500	RES M 150-F-1/4W	
R1522	ERC12GK103D	RES C 10K-K-1/2W	
R1523	ERDS2TJ104T	RES C 100K-J-1/4W	
R1524	EROS2THF1401	RES M 1.4K-F-1/4W	
R1527	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R1528	ERDS2TJ332T	RES C 3.3K-J-1/4W	
R1529	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R1532	ERJ6ENF2201V	RES M 2.2K-F-1/10W	
R1542	ERG2SJD333L	RES M 33K-J-2W	
R1544	ERJ6GEYJ471V	RES M 470-J-1/10W	
R1546	ERJ6GEYJ221V	RES M 220-J-1/10W	
R1599	ERJ6ENF9761V	RES M 9760-F-1/10W	
R2222	ERDS2TJ220T	RES C 22-J-1/4W	
R2223	ERDS2TJ220T	RES C 22-J-1/4W	
R2224	ERDS2TJ220T	RES C 22-J-1/4W	
R2225	ERDS2TJ220T	RES C 22-J-1/4W	

Ref. No.	Part No.	Part Name & Description	Remarks
R2226	ERDS2TJ220T	RES C 22-J-1/4W	
R2227	ERDS2TJ220T	RES C 22-J-1/4W	
R2228	ERDS2TJ220T	RES C 22-J-1/4W	
R2229	ERDS2TJ220T	RES C 22-J-1/4W	
R2230	ERDS2TJ220T	RES C 22-J-1/4W	
R2231	ERDS2TJ220T	RES C 22-J-1/4W	
R2232	ERDS2TJ220T	RES C 22-J-1/4W	
R2233	ERDS2TJ220T	RES C 22-J-1/4W	
R2244	ERDS2TJ220T	RES C 22-J-1/4W	
R2301	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2302	ERJ6GEYJ392V	RES M 3.9K-J-1/10W	
R2303	ERJ6GEYJ271V	RES M 270-J-1/10W	
R2304	ERJ6GEYJ473V	RES M 47K-J-1/10W	
R2305	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R2308	ERJ6GEYJ183V	RES M 18K-J-1/10W	
R2313	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2314	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2315	ERJ6GEYJ122V	RES M 1.2K-J-1/10W	
R2316	ERJ6GEYJ122V	RES M 1.2K-J-1/10W	
R2324	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2325	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2326	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2327	ERJ6GEYJ473V	RES M 47K-J-1/10W	
R2328	ERJ6GEYJ273V	RES M 27K-J-1/10W	
R2329	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R2332	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2334	ERJ6ENF1501V	RES M 1.5K-F-1/10W	
R2335	ERJ6ENF1501V	RES M 1.5K-F-1/10W	
R2336	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2337	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2339	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2342	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2345	ERJ6GEYJ273V	RES M 27K-J-1/10W	
R2346	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R2348	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2349	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2351	ERJ6GEYJ473V	RES M 47K-J-1/10W	
R2352	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R2353	ERJ6ENF4701V	RES M 4.7K-F-1/10W	
R2354	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2355	ERJ6GEYJ683V	RES M 68K-J-1/10W	
R2356	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R2357	ERJ6ENF1303V	RES M 130K-F-1/10W	
R2358	ERJ6GEYJ223V	RES M 22K-J-1/10W	
R2359	ERJ6GEYJ683V	RES M 68K-J-1/10W	
R2360	ERJ6ENF4701V	RES M 4.7K-F-1/10W	
R2361	ERJ6ENF1202V	RES.M 1.2K-F-1/10W	
R2362	ERJ12YJ101U	RES M 100-J-1/2W	
R2363	ERJ6ENF5232V	RES M 5.32K-F-1/10W	
R2364	ERJ6ENF1202V	RES.M 1.2K-F-1/10W	
R2365	ERJ6ENF1202V	RES.M 1.2K-F-1/10W	
R2366	ERJ6ENF1202V	RES.M 1.2K-F-1/10W	
R2367	ERJ12YJ101U	RES M 100-J-1/2W	
R2368	ERJ6ENF5232V	RES M 5.32K-F-1/10W	

Ref. No.	Part No.	Part Name & Description	Remarks
R2371	ERJ6GEYJ101V	RES M 100-J-1/10W	
R2372	ERJ6GEYJ101V	RES M 100-J-1/10W	
R2373	ERJ6GEYJ101V	RES M 100-J-1/10W	
R2374	ERJ6GEYJ220V	RES M 22-J-1/10W	
R2375	ERJ6GEYJ220V	RES M 22-J-1/10W	
R2376	ERDS2TJ220T	RES C 22-J-1/4W	
R2377	ERDS2TJ220T	RES C 22-J-1/4W	
R2378	ERDS2TJ220T	RES C 22-J-1/4W	
R2379	ERDS2TJ220T	RES C 22-J-1/4W	
R2380	ERDS2TJ220T	RES C 22-J-1/4W	
R2381	ERDS2TJ220T	RES C 22-J-1/4W	
R2386	ERJ6GEYJ101V	RES M 100-J-1/10W	
R2402	ERJ6GEYJ101V	RES M 100-J-1/10W	
R2407	ERDS2TJ220T	RES C 22-J-1/4W	
R2408	ERDS2TJ220T	RES C 22-J-1/4W	
R2409	ERDS2TJ220T	RES C 22-J-1/4W	
R2410	ERDS2TJ220T	RES C 22-J-1/4W	
R2411	ERDS2TJ220T	RES C 22-J-1/4W	
R2412	ERDS2TJ220T	RES C 22-J-1/4W	
R2413	ERDS2TJ220T	RES C 22-J-1/4W	
R2414	ERDS2TJ220T	RES C 22-J-1/4W	
R2419	ERJ6GEYJ221V	RES M 220-J-1/10W	
R2420	ERJ6GEYJ101V	RES M 100-J-1/10W	
R2421	ERJ6GEYJ101V	RES M 100-J-1/10W	
R2422	ERJ6GEYJ101V	RES M 100-J-1/10W	
R2423	ERJ6GEYJ101V	RES M 100-J-1/10W	
R2424	ERJ6GEYJ101V	RES M 100-J-1/10W	
R2425	ERJ6GEYJ101V	RES M 100-J-1/10W	
R2426	ERJ6GEYJ101V	RES M 100-J-1/10W	
R2451	ERJ6GEYJ681V	RES M 680-J-1/10W	
R2452	ERJ6GEYJ681V	RES M 680-J-1/10W	
R2456	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2457	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2459	ERJ6GEYJ123V	RES M 12K-J-1/10W	
R2460	ERJ6GEYJ101V	RES M 100-J-1/10W	
R2461	ERJ6GEYJ101V	RES M 100-J-1/10W	
R2501	ERJ6ENF2700V	RES M 270-F-1/10W	
R2502	ERJ6ENF4700V	RES M 470-F-1/10W	
R2503	ERJ6ENF4700V	RES M 470-F-1/10W	
R2504	ERJ6GEYJ221V	RES M 220-J-1/10W	
R2505	ERJ6ENF33R0V	RES M 33.OK-F-1/10W	
R2506	ERJ6ENF33R0V	RES M 33.OK-F-1/10W	
R2507	ERJ6GEYJ221V	RES M 220-J-1/10W	
R2508	ERJ6ENF4700V	RES M 470-F-1/10W	
R2509	ERJ6ENF2700V	RES M 270-F-1/10W	
R2510	ERJ6ENF4700V	RES M 470-F-1/10W	
R2511	ERJ6ENF2700V	RES M 270-F-1/10W	
R2512	ERJ6ENF4700V	RES M 470-F-1/10W	
R2513	ERJ6ENF33R0V	RES M 33.OK-F-1/10W	
R2514	ERJ6ENF4700V	RES M 470-F-1/10W	
R2515	ERJ6GEYJ221V	RES M 220-J-1/10W	
R2516	ERJ6GEYJ470V	RES M 47-J-1/10W	
R2517	ERDS2TJ182T	RES C 1.8K-J-1/4W	
R2518	ERDS2TJ330T	RES C 33-J-1/4W	



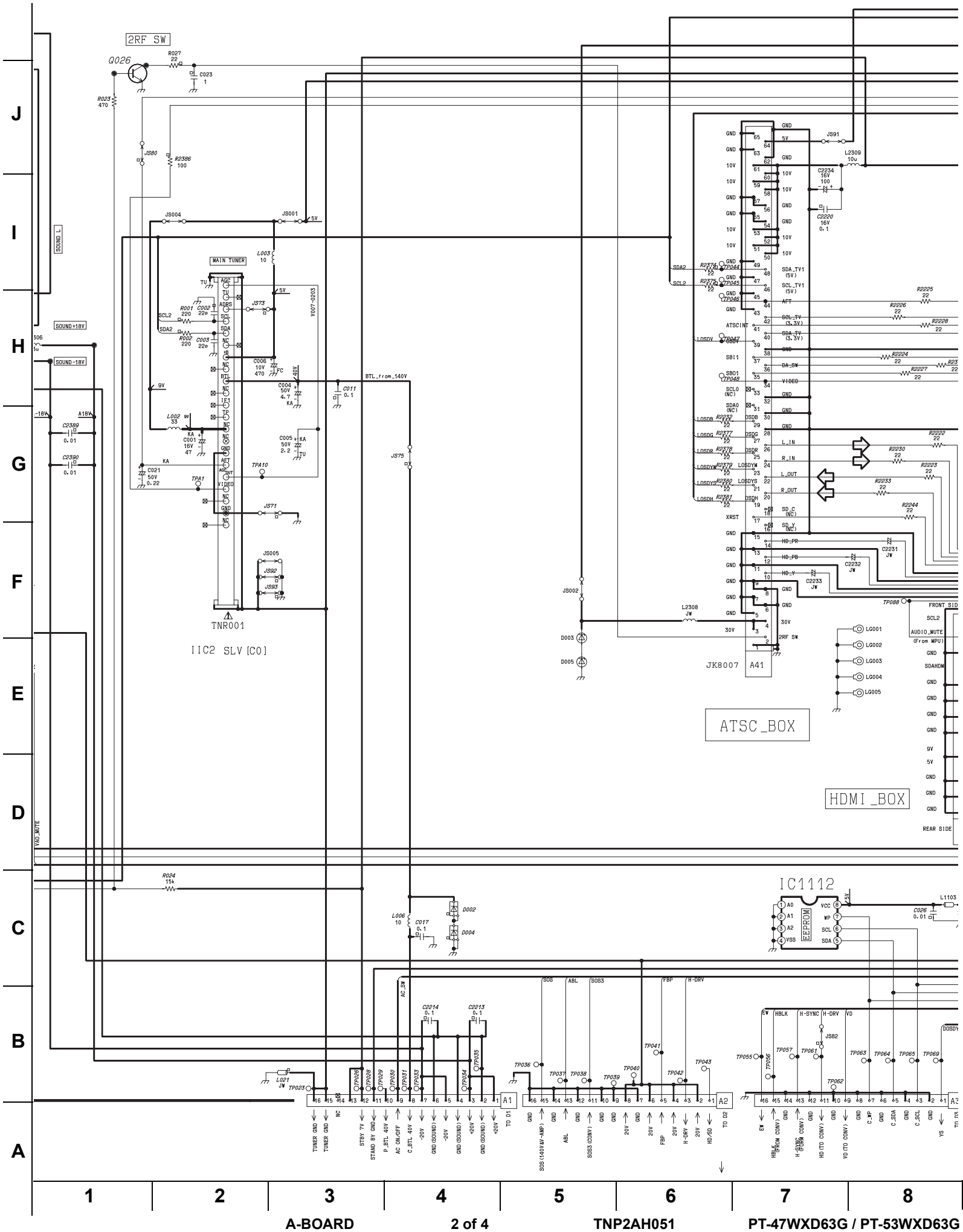
Ref. No.	Part No.	Part Name & Description	Remarks
R2519	ERJ6GEYJ100V	RES M 10-J-1/10W	
R2520	ERJ6GEYJ100V	RES M 10-J-1/10W	
R2537	ERJ6GEYJ122V	RES M 1.2K-J-1/10W	
R2538	ERJ6GEYJ122V	RES M 1.2K-J-1/10W	
R2539	ERJ6GEYJ122V	RES M 1.2K-J-1/10W	
R2541	ERJ6GEYJ122V	RES M 1.2K-J-1/10W	
R2542	ERJ6GEYJ122V	RES M 1.2K-J-1/10W	
R2543	ERJ6GEYJ122V	RES M 1.2K-J-1/10W	
R2568	ERJ6ENF6801V	RES M 6.8K-F-1/10W	
R2569	ERJ6ENF8201V	RES M 8.2K-F-1/10W	
R2570	ERJ6GEYJ100V	RES M 10-J-1/10W	
R2571	ERJ6GEYJ100V	RES M 10-J-1/10W	
R2573	ERJ6GEYJ221V	RES M 220-J-1/10W	
R2576	ERJ6GEYJ181V	RES M 180-J-1/10W	
R2578	ERJ6GEYJ100V	RES M 10-J-1/10W	
R2580	ERJ6GEYJ221V	RES M 220-J-1/10W	
R2583	ERJ6GEYJ181V	RES M 180-J-1/10W	
R2584	ERJ6GEYJ100V	RES M 10-J-1/10W	
R2590	ERJ6GEYJ181V	RES M 180-J-1/10W	
R2801	ERDS2TJ223T	RES C 22K-J-1/4W	
R2802	EROS2THF1502	RES M 15.0k-f-1/4w	
R2803	ERF2AK5R6	RES M 5.6-K-2W	
R2804	ERG2FJ393H	RES M 39K-J-2W	
R2806	ERDS2TJ184T	RES C 180K-J-1/4W	
R2807	ERDS2TJ102T	RES C 1K-J-1/4W	
R2808	ERDS2TJ102T	RES C 1K-J-1/4W	
R2810	ERDS2TJ823T	RES C 82K-J-1/4W	
R2811	EROS2THF7151	RES M 7.15K-F-1/4W	
R2813	EROS2THF2201	RES M 2.2k-f-1/4w	
R2814	ERG1FJS102E	RES M 1K-J-1W	
R2816	ERC12GK825C	RES C 820MEG-K-1/8W	
R2850	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R2851	ERJ6ENF1001V	RES M 1K-F-1/10W	
R2852	ERJ6ENF4530V	RES M 453-F-1/10W	
R2853	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2854	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2855	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2856	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R2858	ERDS2TJ272T	RES C 2.7K-J-1/4W	
R2859	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R2860	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R3004	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3008	ERJ6ENF75R0V	RES M 75.0-F-1/10W	
R3010	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3011	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3013	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3014	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3015	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3016	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3024	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R3026	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R3028	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3029	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3035	ERJ6GEYJ184V	RES M 180K-J-1/10W	

Ref. No.	Part No.	Part Name & Description	Remarks
R3036	ERJ6GEYJ184V	RES M 180K-J-1/10W	
R3044	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R3045	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R3046	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R3047	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R3048	ERJ6GEYJ152V	RES M 1.5K-J-1/10W	
R3049	ERJ6GEYJ104V	RES M 100K-J-1/10W	
R7001	ERG2FJ820H	RES M 82-J-2W	
R7002	ERG2FJ121H	RES M 120-J-2W	
R7003	ERG2FJ820H	RES M 82-J-2W	
R7004	ERG2FJ121H	RES M 120-J-2W	
R7005	ERG2FJ820H	RES M 82-J-2W	
R7006	ERG2FJ121H	RES M 120-J-2W	
R7011	ERX2FJ2R2H	RES M 2.2-J-2W	
R7012	ERX2FJ2R2H	RES M 2.2-J-2W	
R7013	ERX2FJ2R2H	RES M 2.2-J-2W	
R7014	ERX2FJ2R2H	RES M 2.2-J-2W	
R7015	ERX2FJ2R2H	RES M 2.2-J-2W	
R7016	ERX2FJ2R2H	RES M 2.2-J-2W	
R7023	ERJ6GEYJ273V	RES M 27K-J-1/10W	
R7024	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R7026	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R7027	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R7029	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R7030	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R7031	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R7032	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R7034	ERJ6GEYJ273V	RES M 27K-J-1/10W	
R7035	ERJ6GEYJ472V	RES M 4.7K-J-1/10W	
R7036	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R7037	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R7038	ERJ6GEYJ222V	RES M 2.2K-J-1/10W	
R7040	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7041	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7045	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7046	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7047	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7048	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7052	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R7055	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R7058	ERJ6GEYJ332V	RES M 3.3K-J-1/10W	
R7059	ERJ6GEYJ104V	RES M 100K-J-1/10W	
R7060	ERX1SJR27P	RES M .27-J-1W	
R7061	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R7062	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7063	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7064	ERJ6GEYJ103V	RES M 10K-J-1/10W	
R7065	ERJ6GEYJ102V	RES M 1K-J-1/10W	
R7066	ERX1SJR27P	RES M .27-J-1W	
SWITCHES			
S010	EVQPB05R	SWITCH	
S011	EVQPB05R	SWITCH	
S012	EVQPB05R	SWITCH	
S013	EVQPB05R	SWITCH	

Ref. No.	Part No.	Part Name & Description	Remarks
S014	EVQPB05R	SWITCH	
S015	EVQPB05R	SWITCH	
S016	EVQPB05R	SWITCH	
S017	EVQPB05R	SWITCH	
TRANSFORMERS			
T501	ETH19K204AZ	TRANSFORMER / PT-47WXd63G	
T501	ETH19K204AZ	TRANSFORMER / PT-53WXd63G	
T551	KFT7AA334F1	FLYBACK TRANSFORMER	⚠
T801	ETS42AD495AD	TRANSFORMER	⚠
OTHERS			
TNR001	ENG36620G	TUNER	⚠
TNR8000	ENGE6111D	TUNER (DT-BOARD)	⚠
M001	TSX2AA0381	AC LINE CORD	⚠
1	TXFCRT27GSER	CRT (BLUE)	
	TXFCRT28GSER	CRT (GREEN)	
	TXFCRT29GSER	CRT (RED)	
M002	K3B10CA00006	CRT SOCKET	⚠
2	KDY2ASF83F	DEFLECTION YOKE	⚠
M003	TXF3A01ECV	DAG GND	
3	TKG2AF020-1	A/B LENS / PT-47WXd63G	
	TKG2AF021-1	A/B LENS / PT-53WXd63G	
4	TKG2AA50091	MIRROR GLASS / PT-47WXd63G	
	TKG2AA50111	MIRROR GLASS / PT-53WXd63G	
5	TMW2AX0041B	MIRROR BRACKET (SIDE)	
6	TMW2AX0161	MIRROR BRACKET (TOP)	
7	TKG2AD00071	PROTECTIVE SCREEN PANEL / PT-47WXd63G	
	TKG2AD00091	PROTECTIVE SCREEN PANEL / PT-53WXd63G	
8	TKG2AH50381	LENTICULAR SCREEN / PT-53WXd63G	
	TKG2AH50461	LENTICULAR SCREEN / PT-47WXd63G	
9	TKG2AH50611	FRESNEL SCREEN / PT-53WXd63G	
	TKG2AH50681	FRESNEL SCREEN / PT-47WXd63G	
10	TMW2AX0131	SCREEN BRACKET / PT-47WXd63G	
	TMW2AX0171	SCREEN BRACKET / PT-53WXd63G	
11	TMW2AX0181	CORNER BRACKET / PT-53WXd63G	
12	TKU2AC2601S	BACK CABINET / PT-53WXd63G	
	TKU2AC2201S	BACK CABINET / PT-47WXd63G	
13	TKD2AX0324S	CABINET FRONT BOARD	
14	TKY2AA3003S	FRONT CABINET / PT-47WXd63G	
	TKY2AA3405AS	FRONT CABINET / PT-53WXd63G	
15	TKB2AA0174S	WOOD CABINET / PT-47WXd63G	
	TKB2AA0203S	WOOD CABINET / PT-53WXd63G	
M004	TBL2AH30071	CASTER	
16	TKD2AX2572S	INNER BARRIER BOARD	
17	TKU2AA03901	LOWER BACK COVER	
18	TAS2AA0022	SPEAKER (TWEETER) / PT-47WXd63G	
	EASJ6PH05A3	SPEAKER (TWEETER) / PT-53WXd63G	
19	TAS2AA0027	SPEAKER (WOOFER) / PT-47WXd63G	
	EAST14PL31A6	SPEAKER (WOOFER) / PT-53WXd63G	
20	TKP2AA0626S	SPEAKER GRILLE	
21	TBM2AA0012	PANASONIC BADGE	
22	KFT7CP336F	DISTRIBUTOR	⚠
23	D9ZZ00000079	FOCUS PACK	⚠

Ref. No.	Part No.	Part Name & Description	Remarks
<a href="#">24</a>	UDQFSEH58F	FAN	
<a href="#">25</a>	TXFKP20GSER	REAR BRACKET	
<a href="#">26</a>	TKD2AX1857S	FRONT PANEL	
<a href="#">27</a>	TXFKP19GSER	DOOR PANEL	
<a href="#">28</a>	TXFKP18GSER	CONTROL PANEL	
<a href="#">29</a>	TBX2AA2801G	BUTTON KEYPAD	
<a href="#">30</a>	TKP2AA0921	LED PANEL	
<a href="#">31</a>	TEK6935	LATCH	
M005	ENPE633	SPLITTER	
M006	TMM2AE10171	GROMMET SQUARE	
JG1	K1NA68B00035	PC-BOARD CONNECTOR	
JG2	K1NA12B00002	SD-CARD CONNECTOR	
JK1001	TJB2AA0482	FRONT A/V TERMINAL	
JK3001	TJB2AA0251	REAR A/V TERMINAL 12 PIN	
JK3002	TJB2AA0241	REAR A/V TERMINAL 10 PIN	
JK5001	K1FA119E0001	HDMI CONNECTOR	
JK5002	TJB2AA0411	AUDIO IN TERMINAL 2 PIN	
JK8002	K1NA68B00036	POD CONNECTOR	
JK8003	K1NA12E00001	SD SERVICE CARD CONNECTOR	
OTHER ACCESORIES			
M007	TQB2AA0474	OWNERS MANUAL	
M008	EUR7627Z10	REMOTE CONTROL	
M009	UR76EC2703A	REMOTE CONTROL BATTERY COVER	



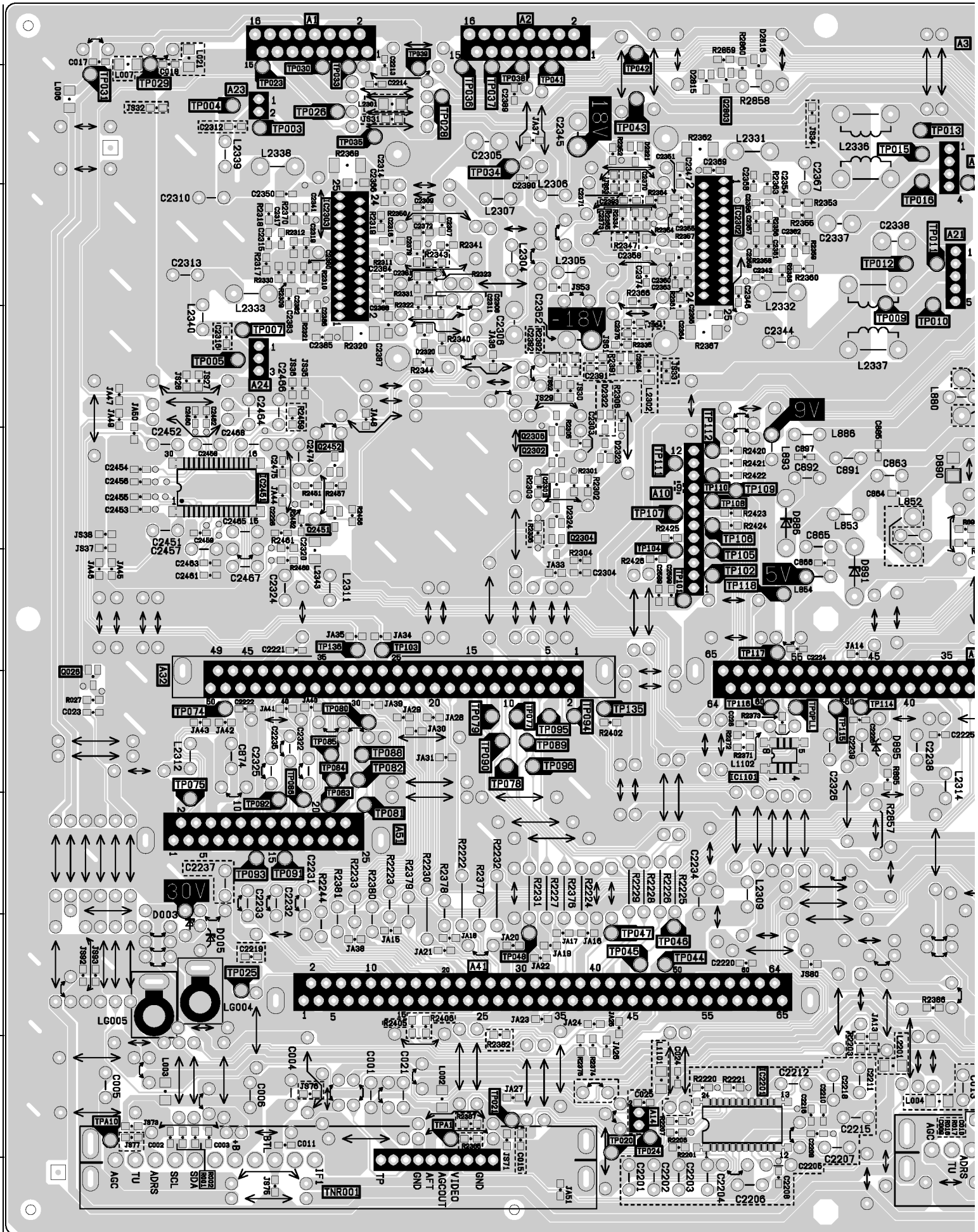


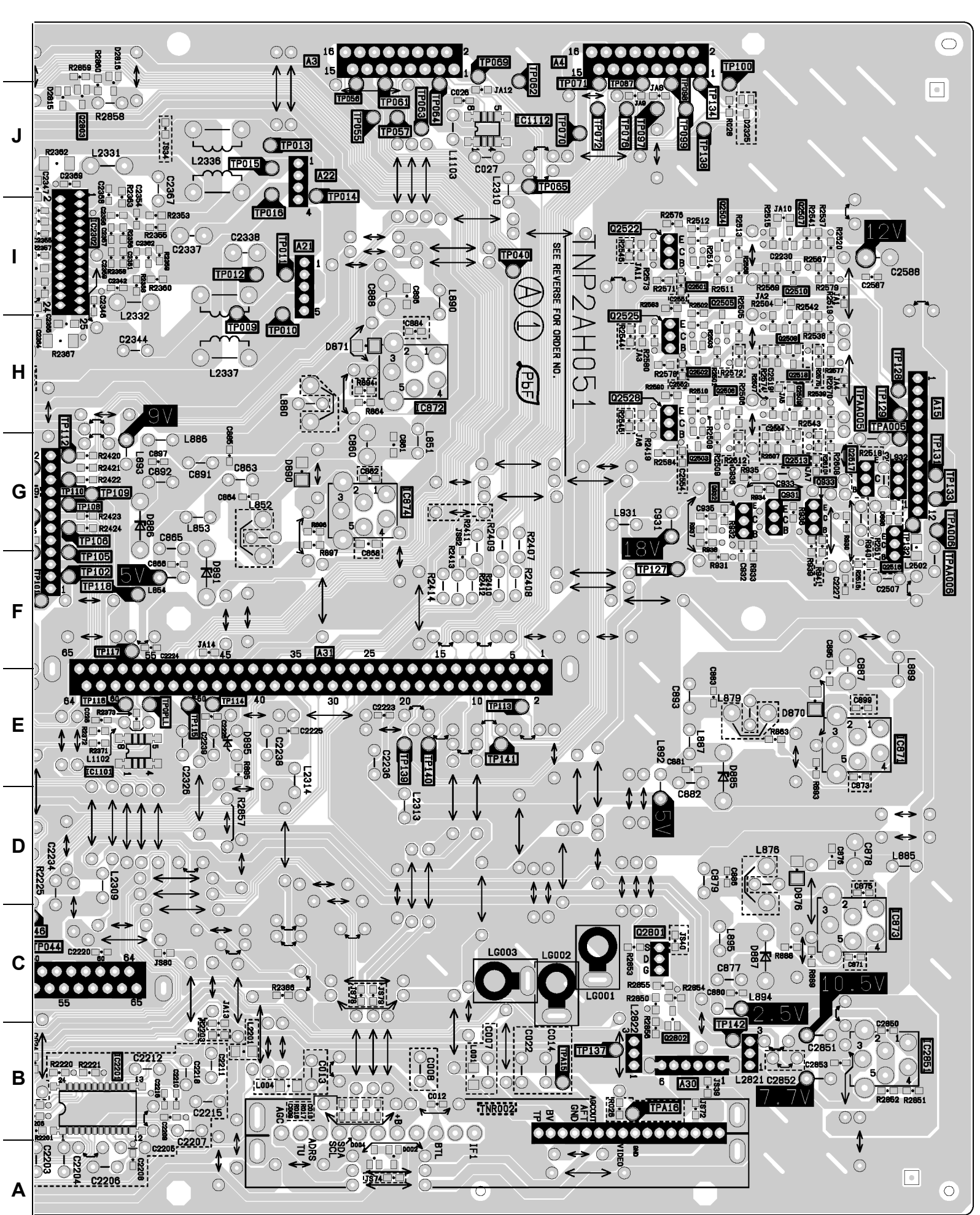






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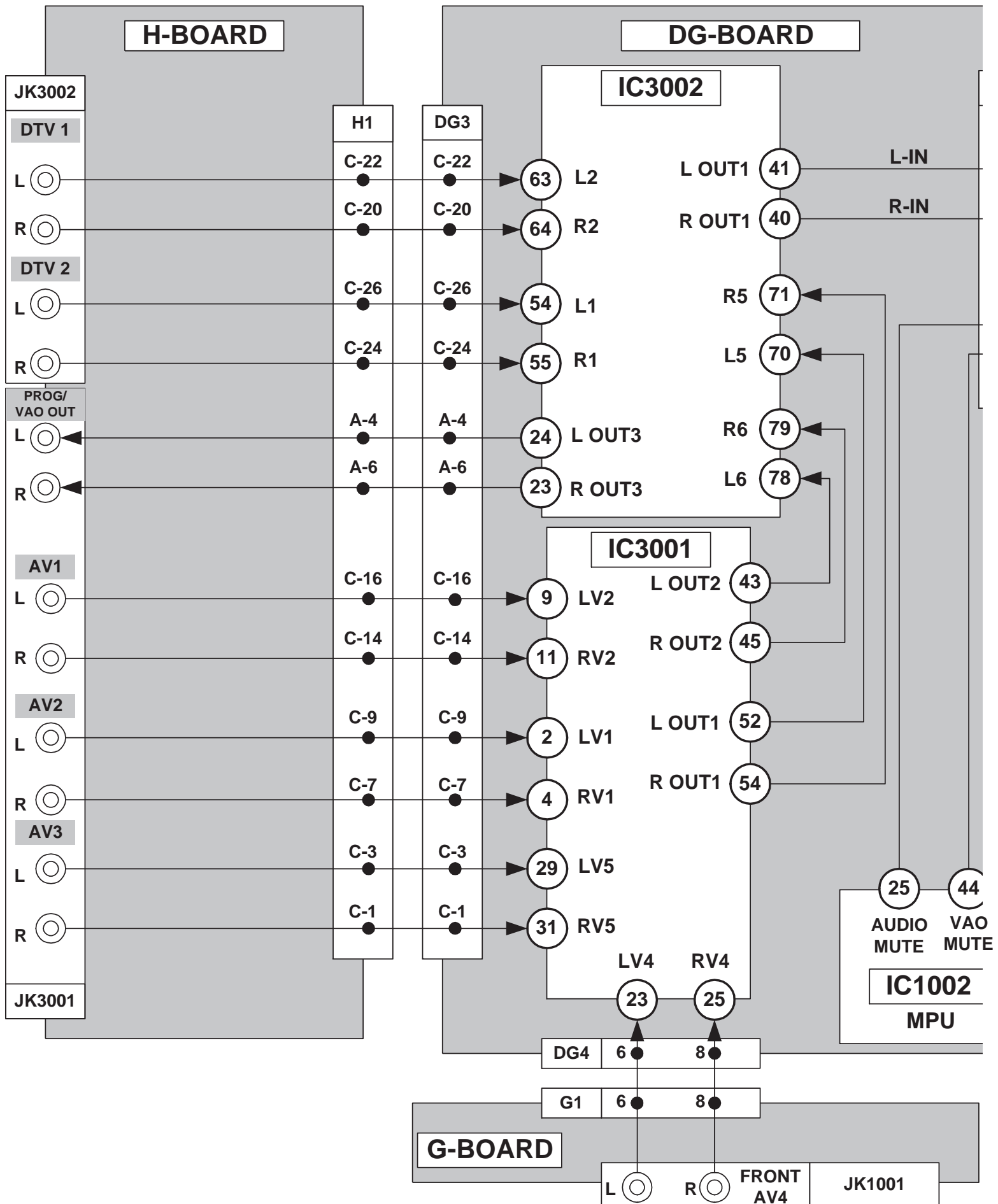
A-BOARD

2 of 2

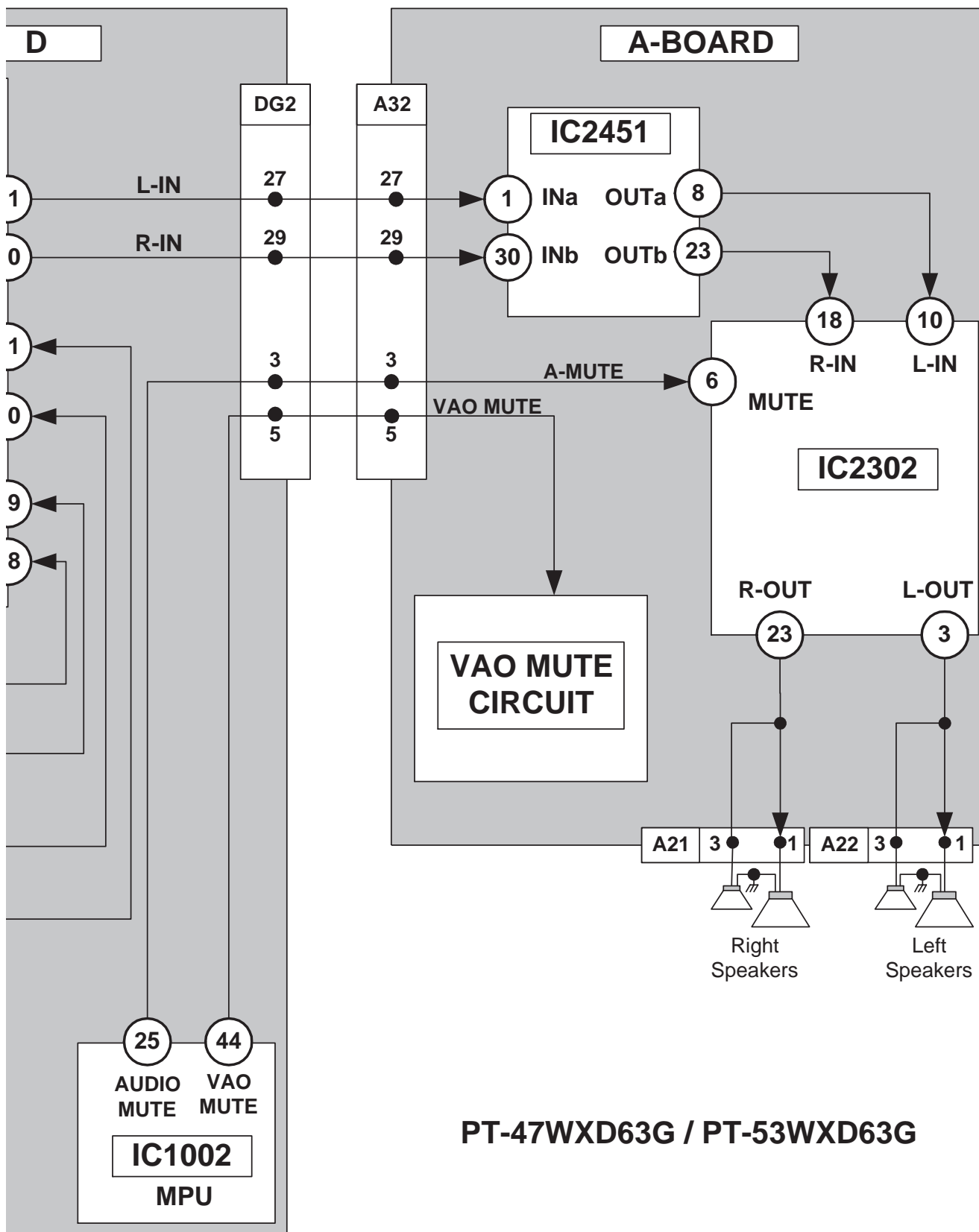
TNP2AH051

PT-47WXD63G / PT-53WXD63G

# Audio signal path block diagram



m

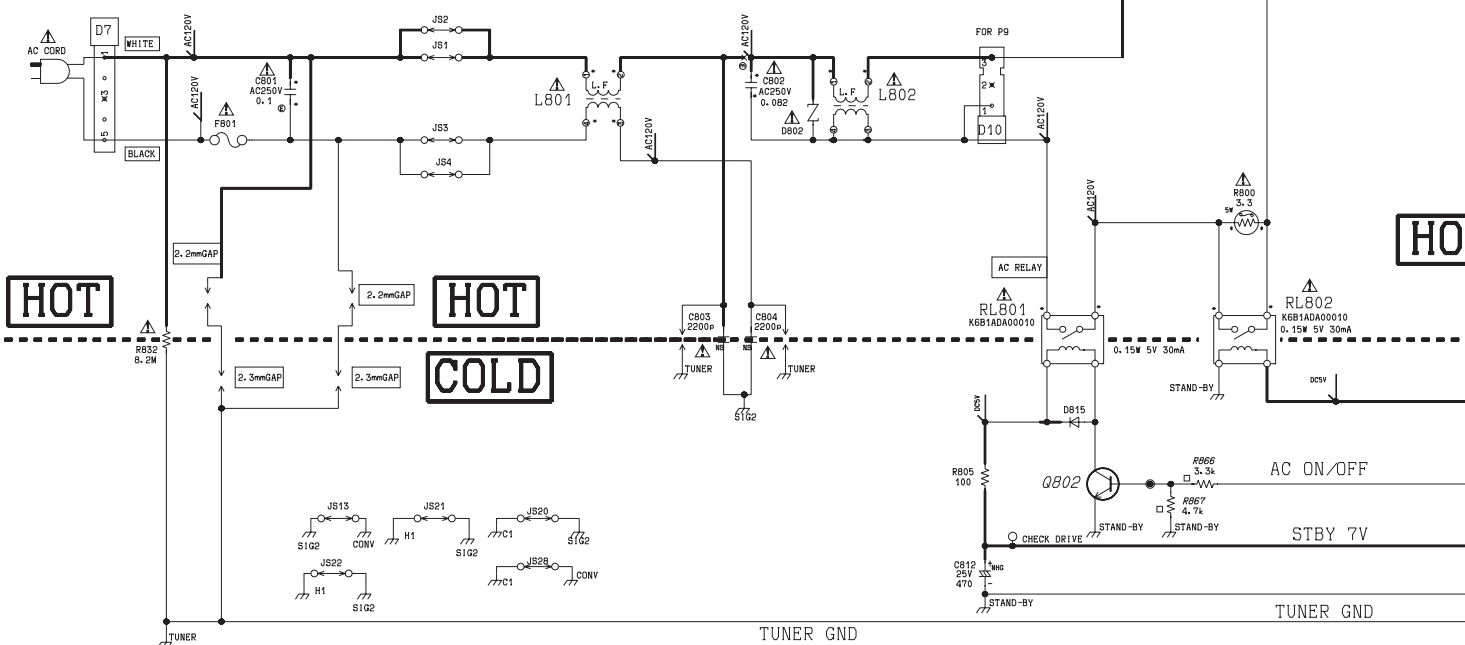
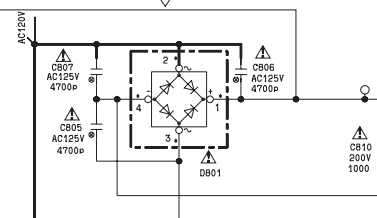
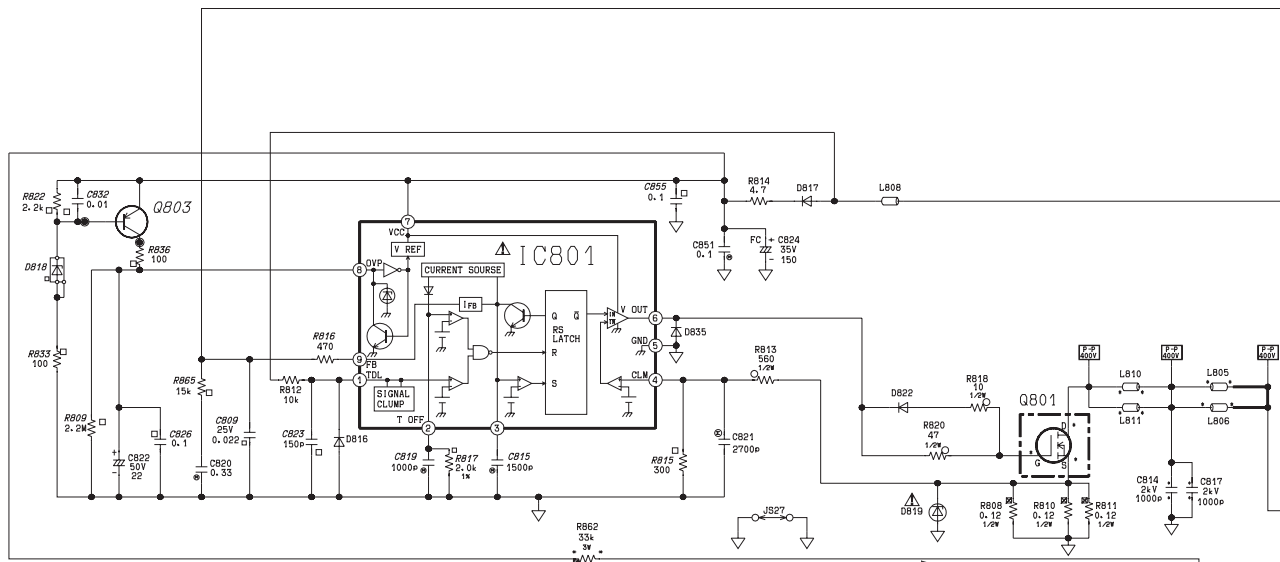


PT-47WXD63G / PT-53WXD63G

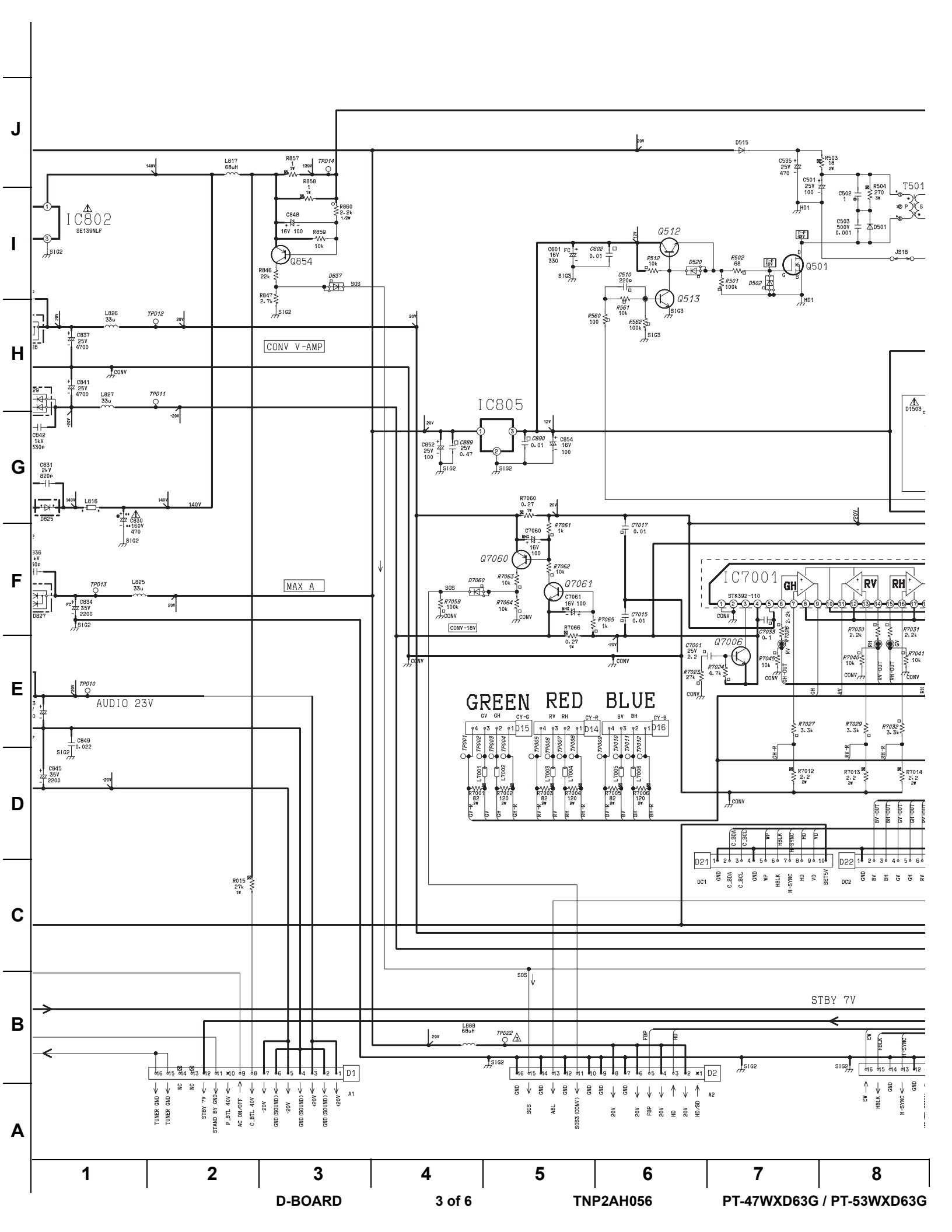
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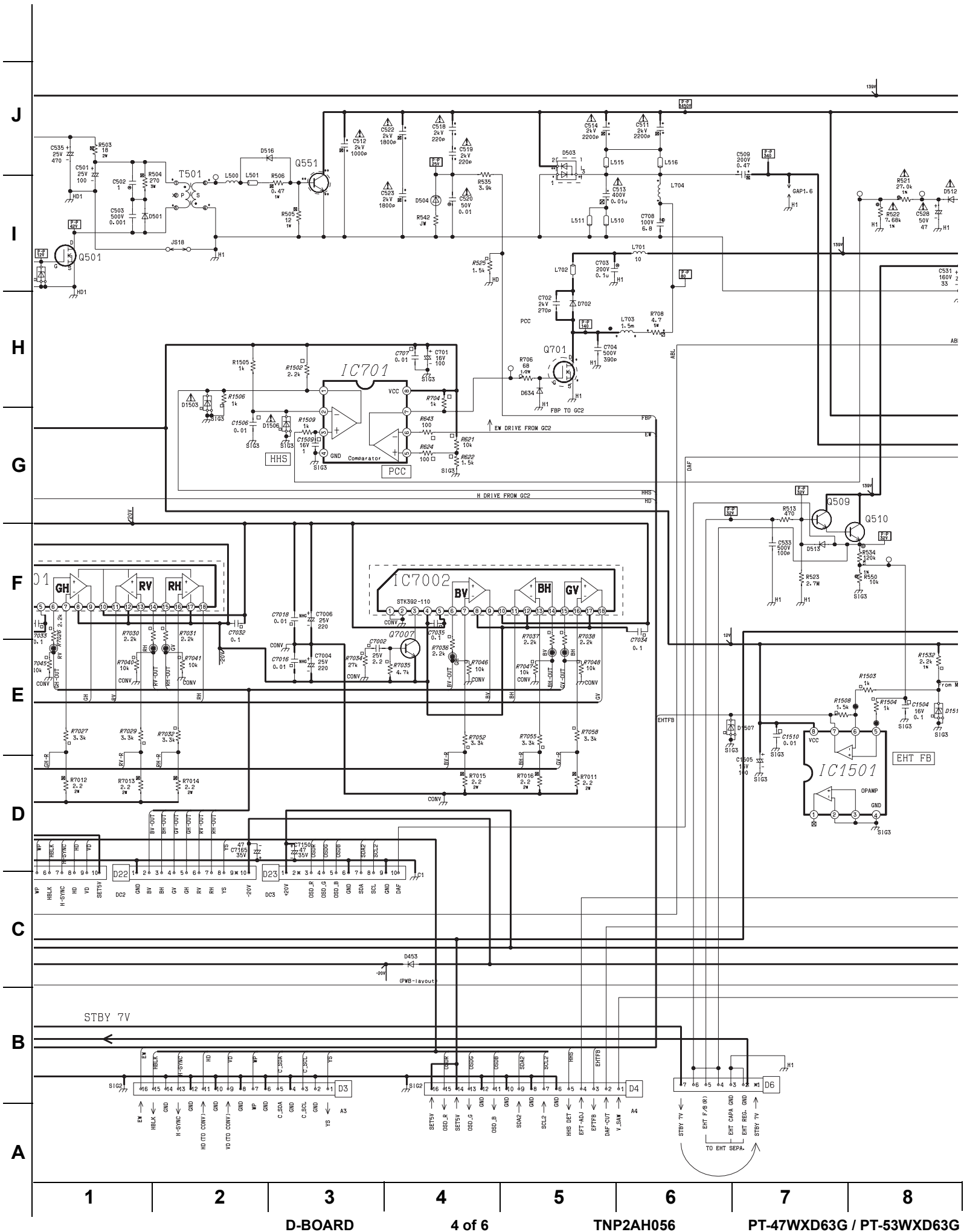
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TNP2AH056 (D)

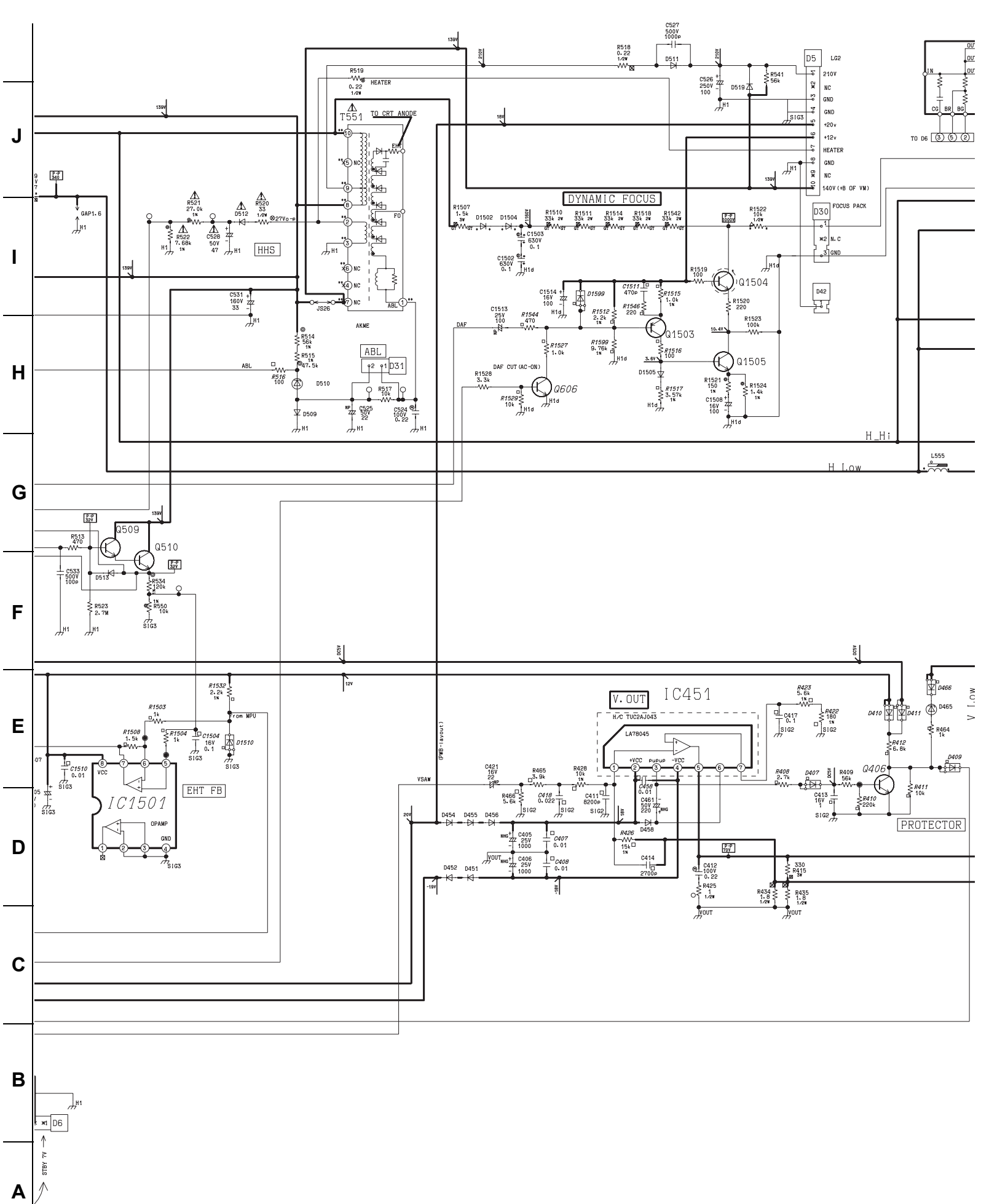


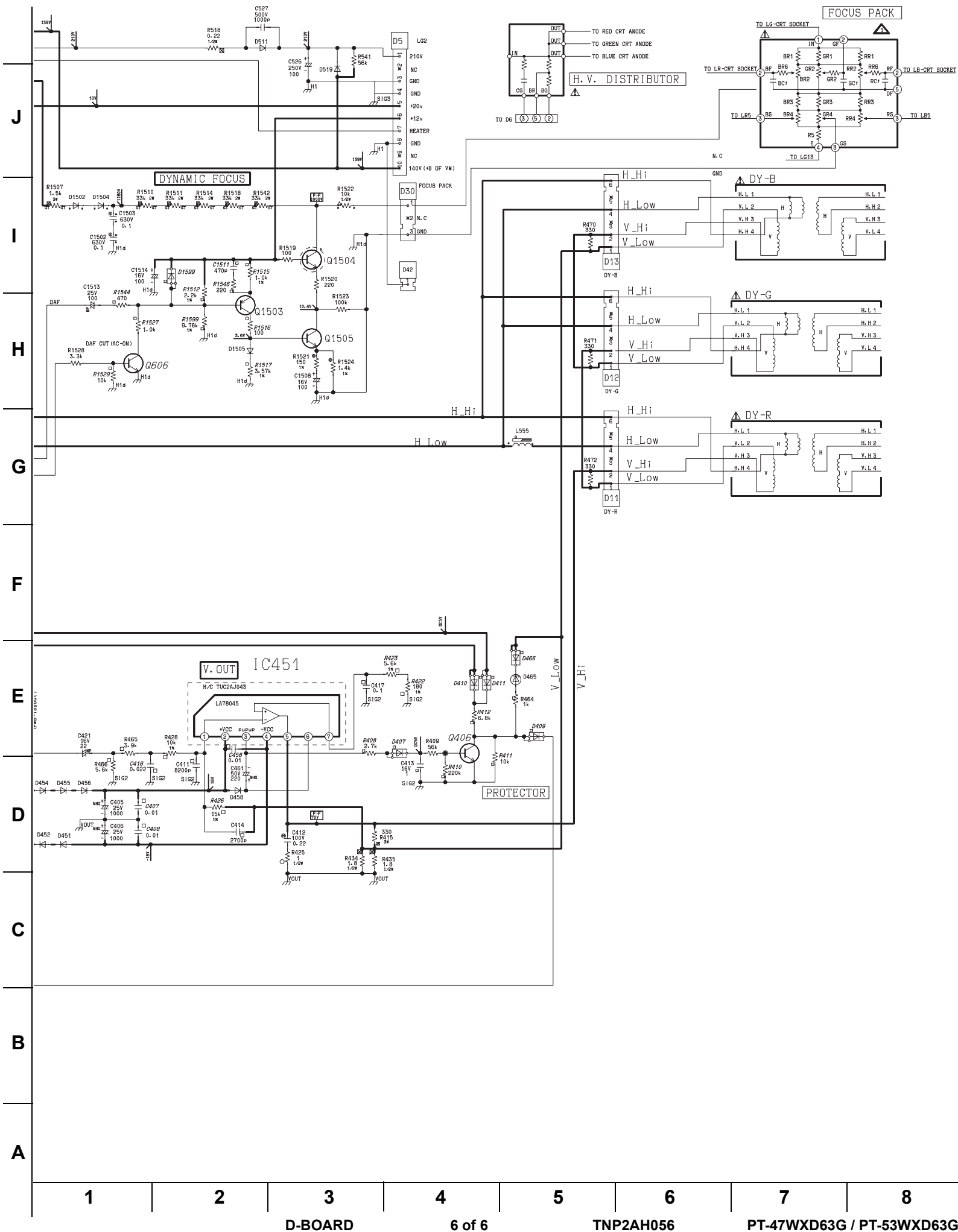








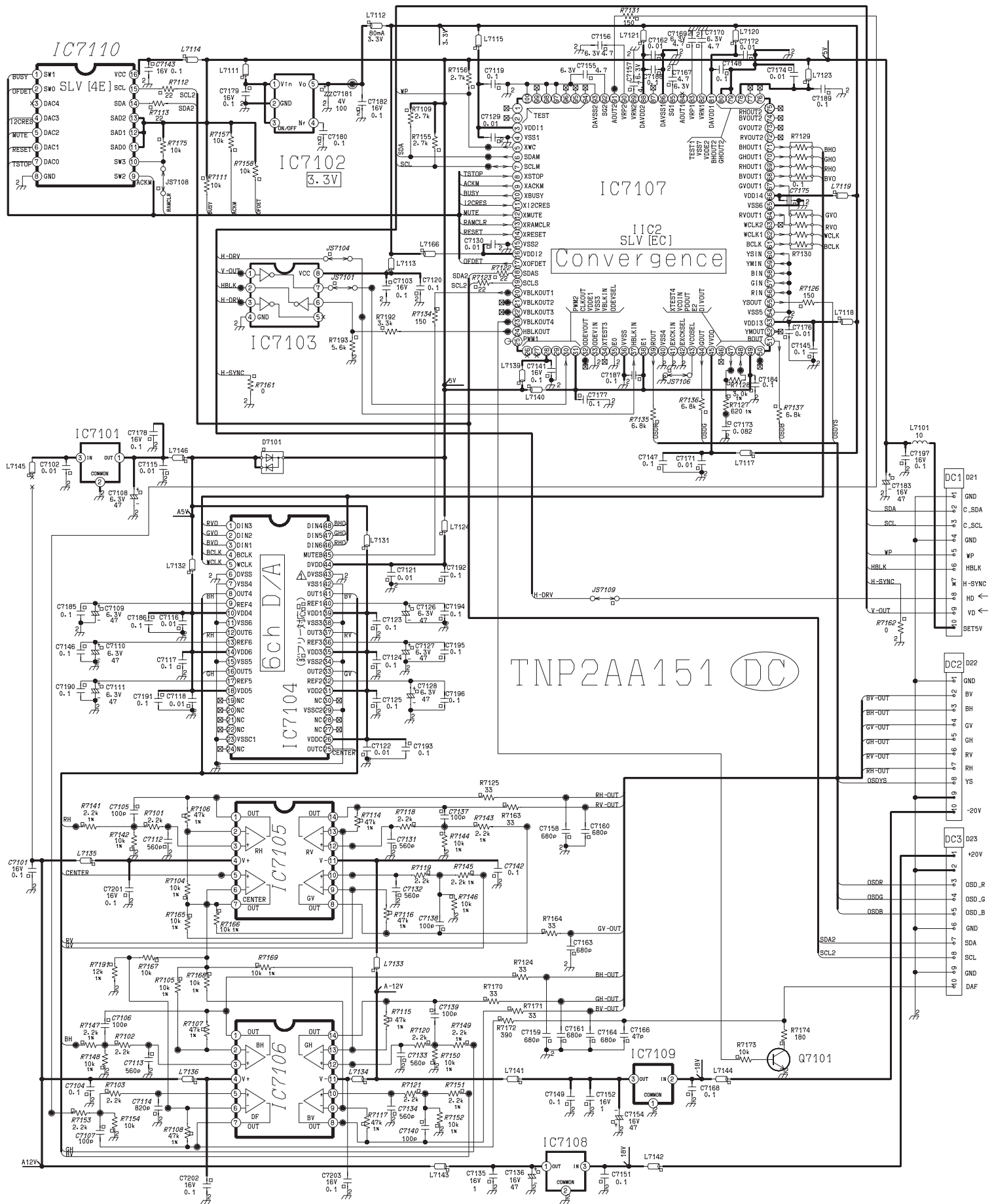








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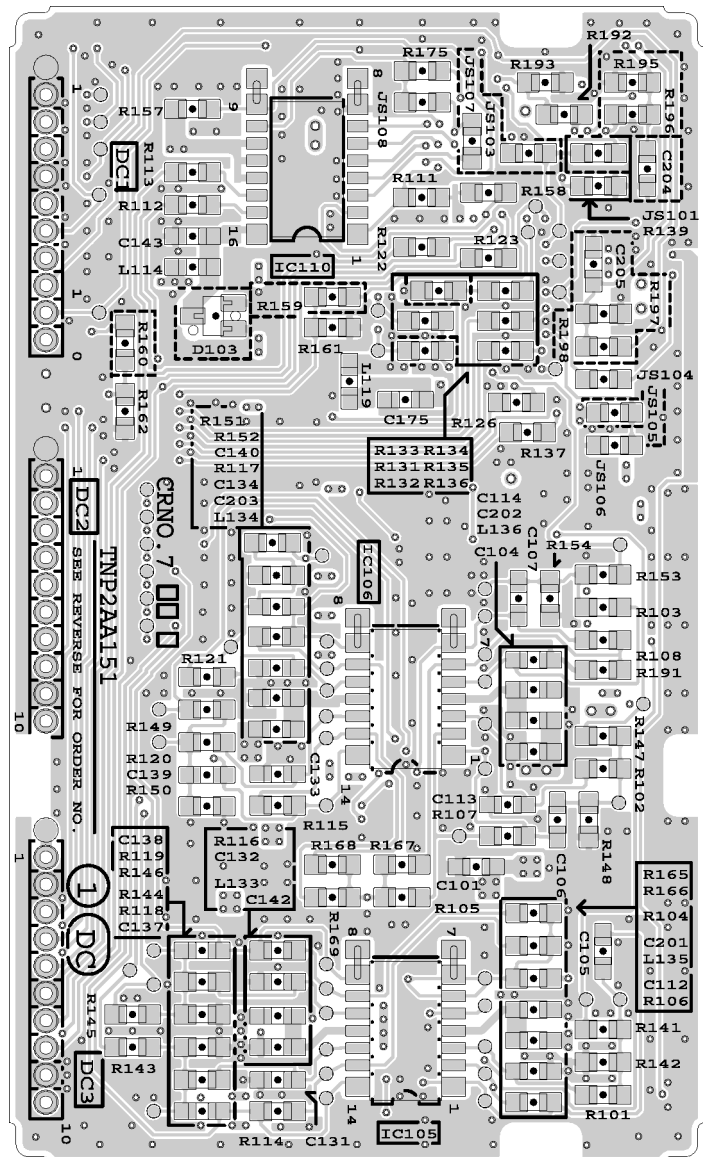
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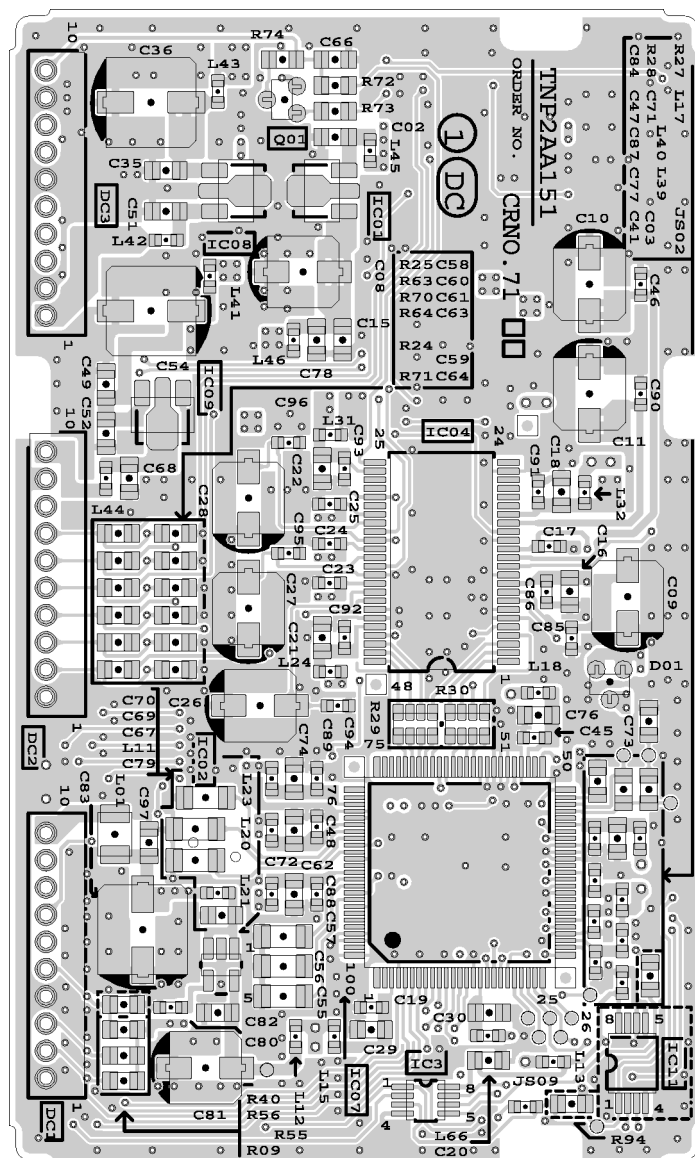
DC-PCB

BOTTOM VIEW

TNP2AA151

PT-47WXD63G / PT-53WXD63G

# A





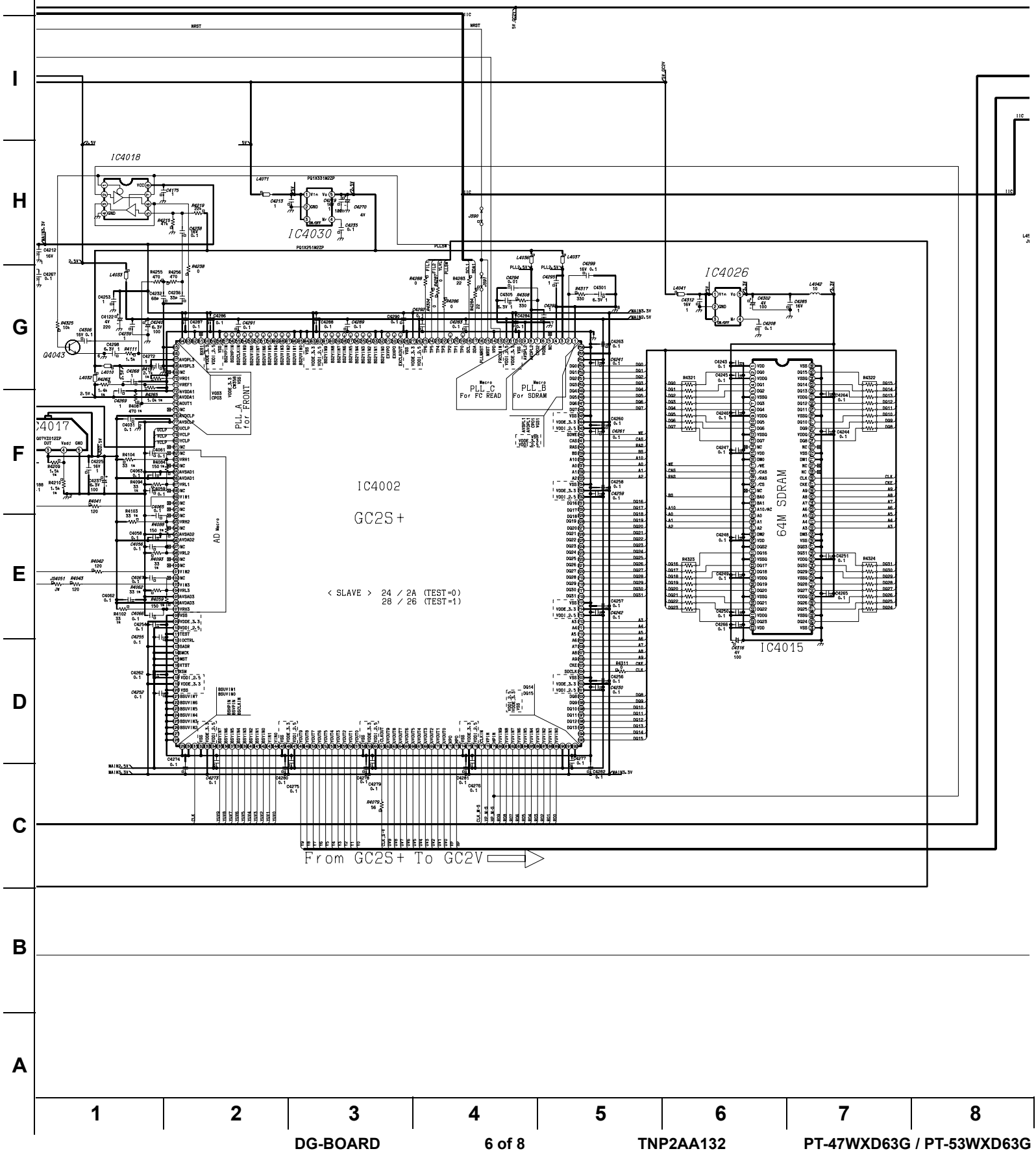




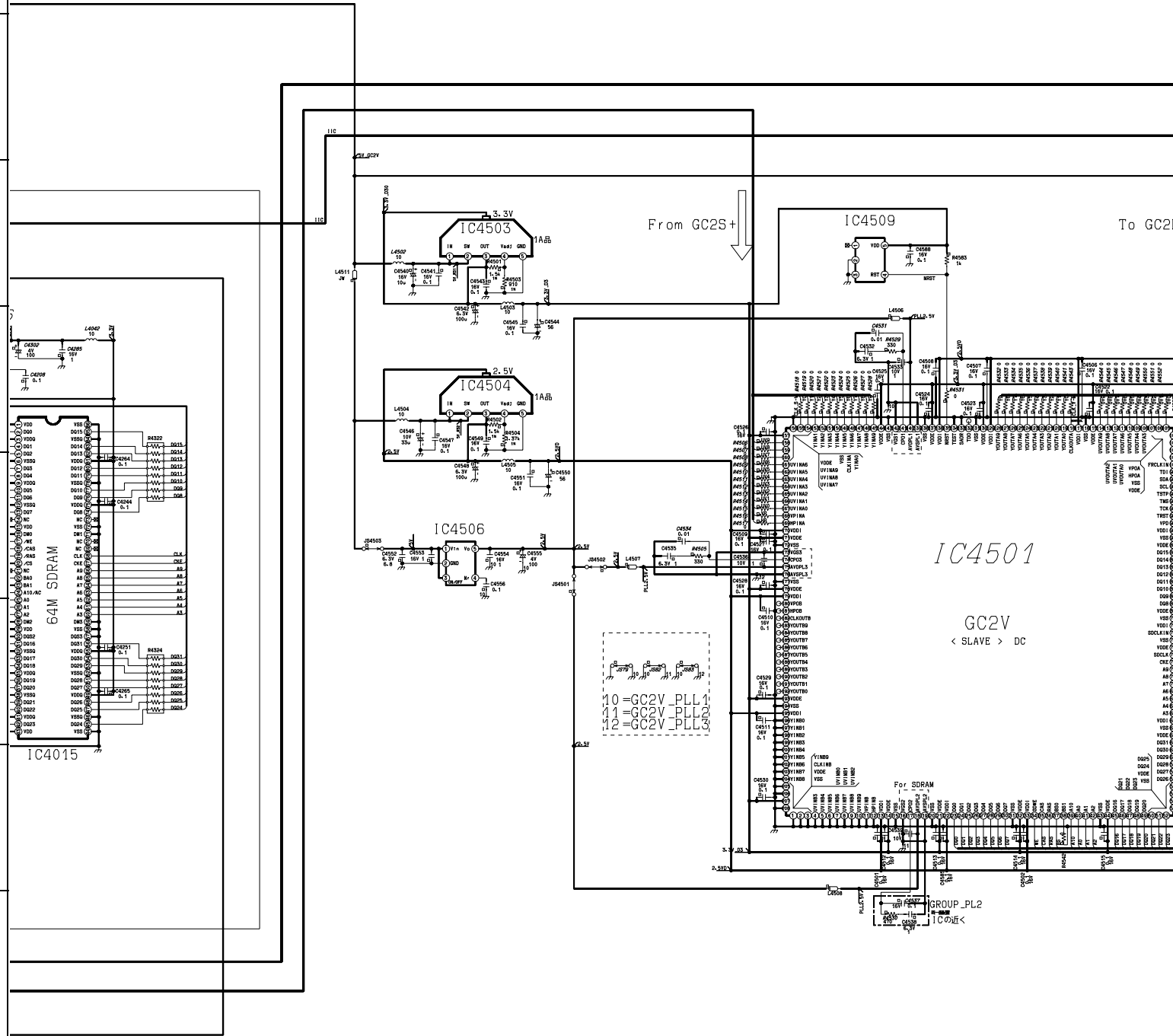








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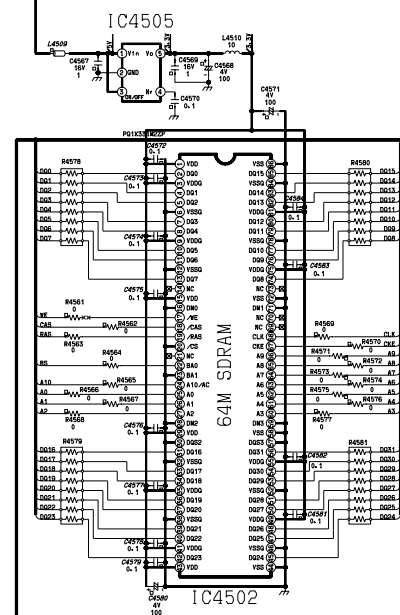
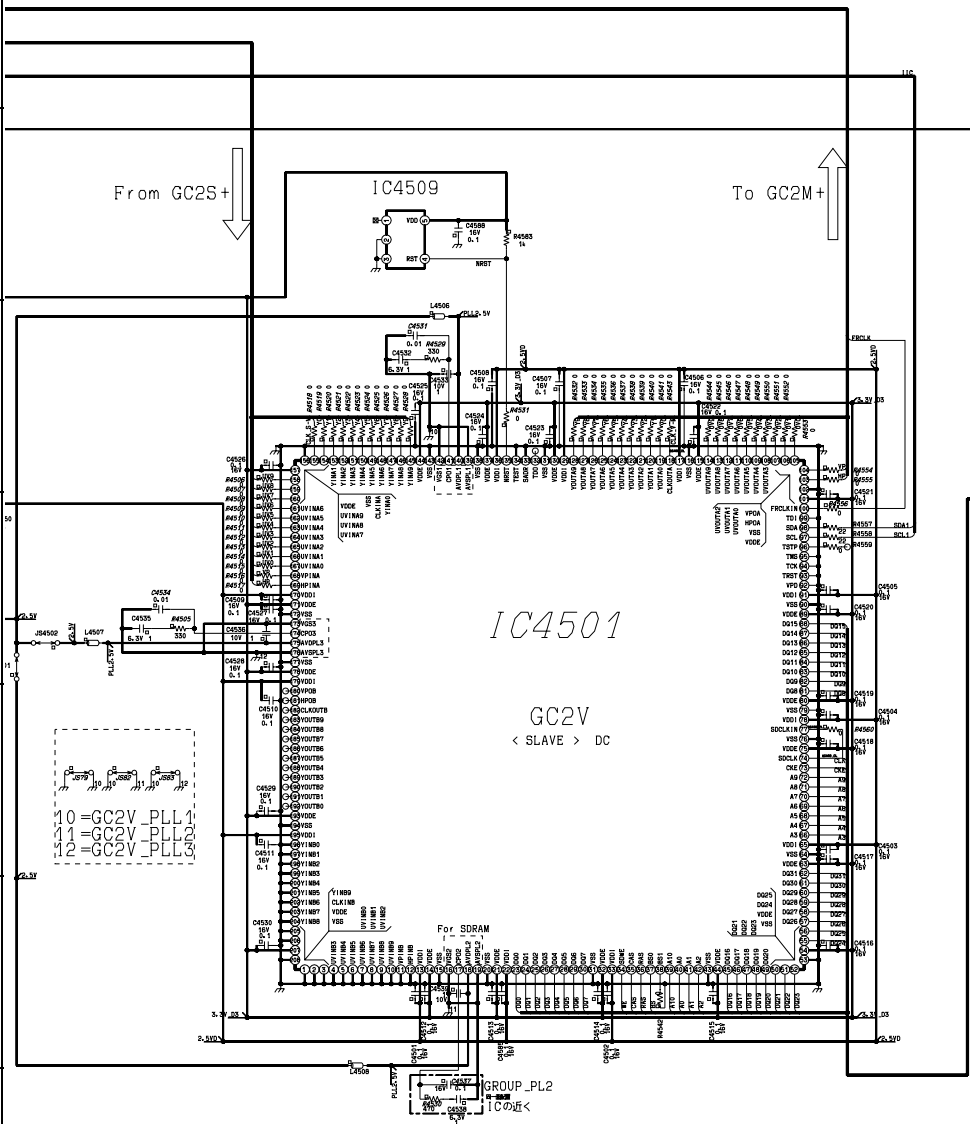
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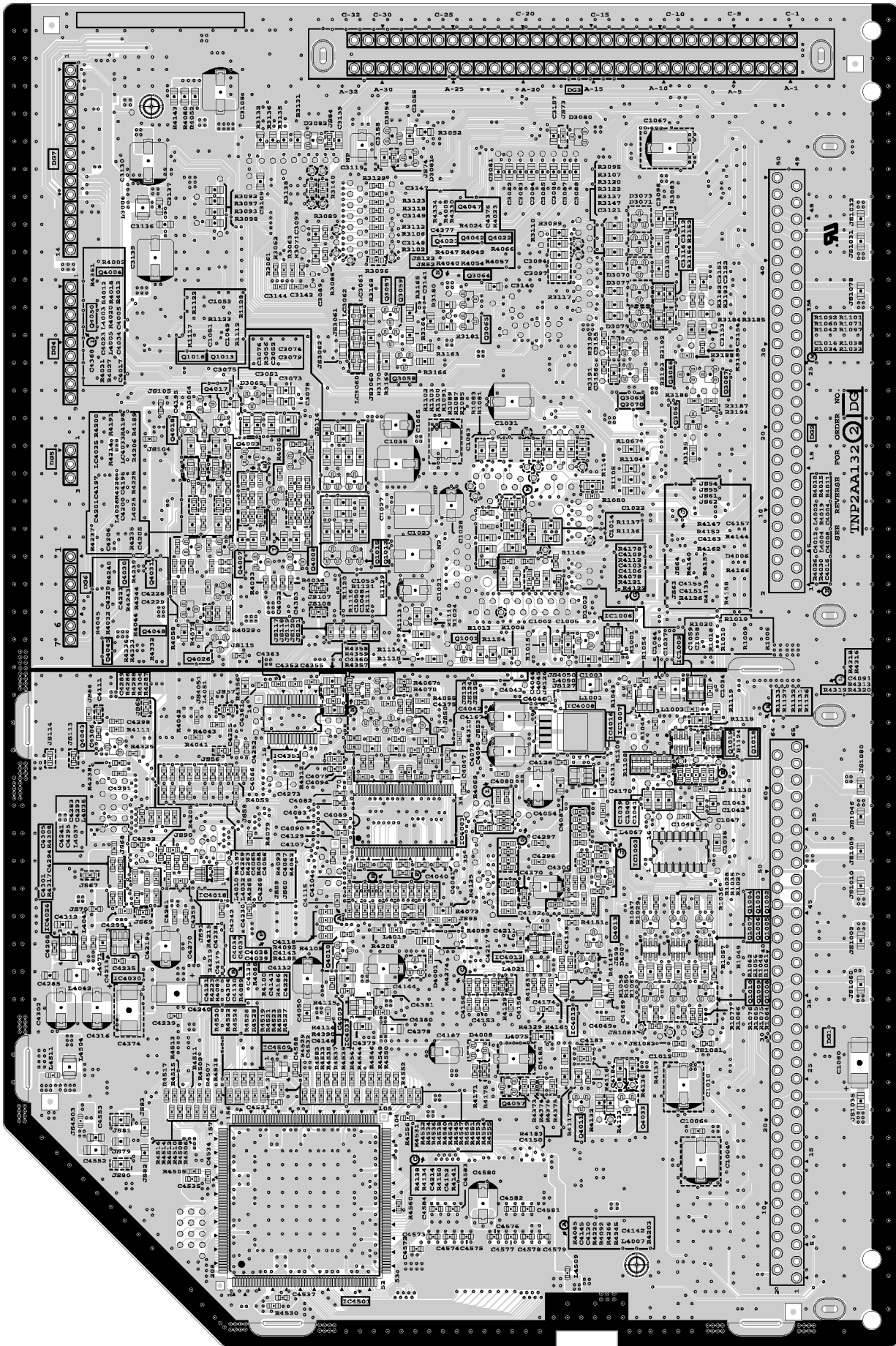
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DG-PCB

BOTTOM VIEW

TNP2AA132

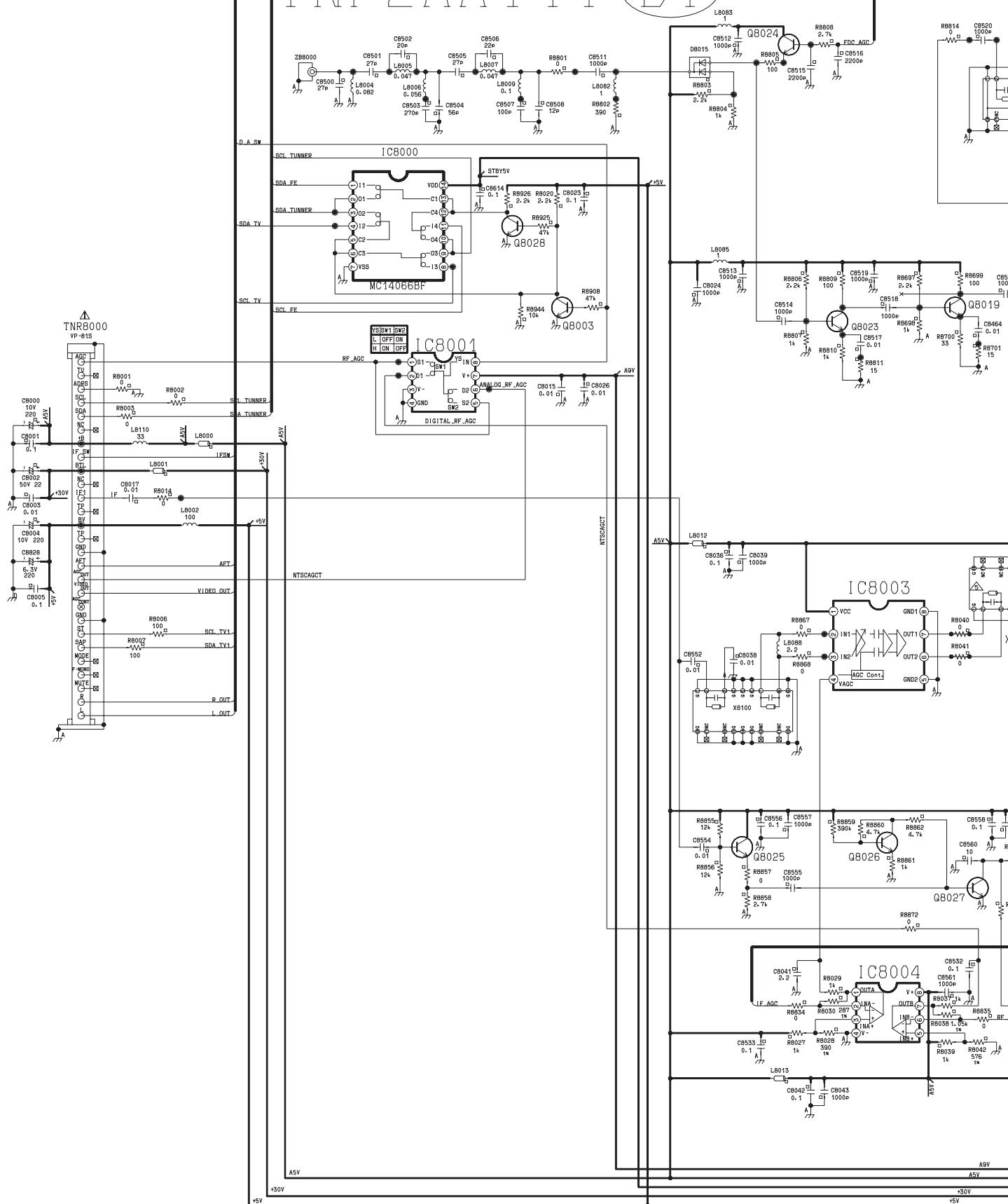
PT-47WXD63G / PT-53WXD63G

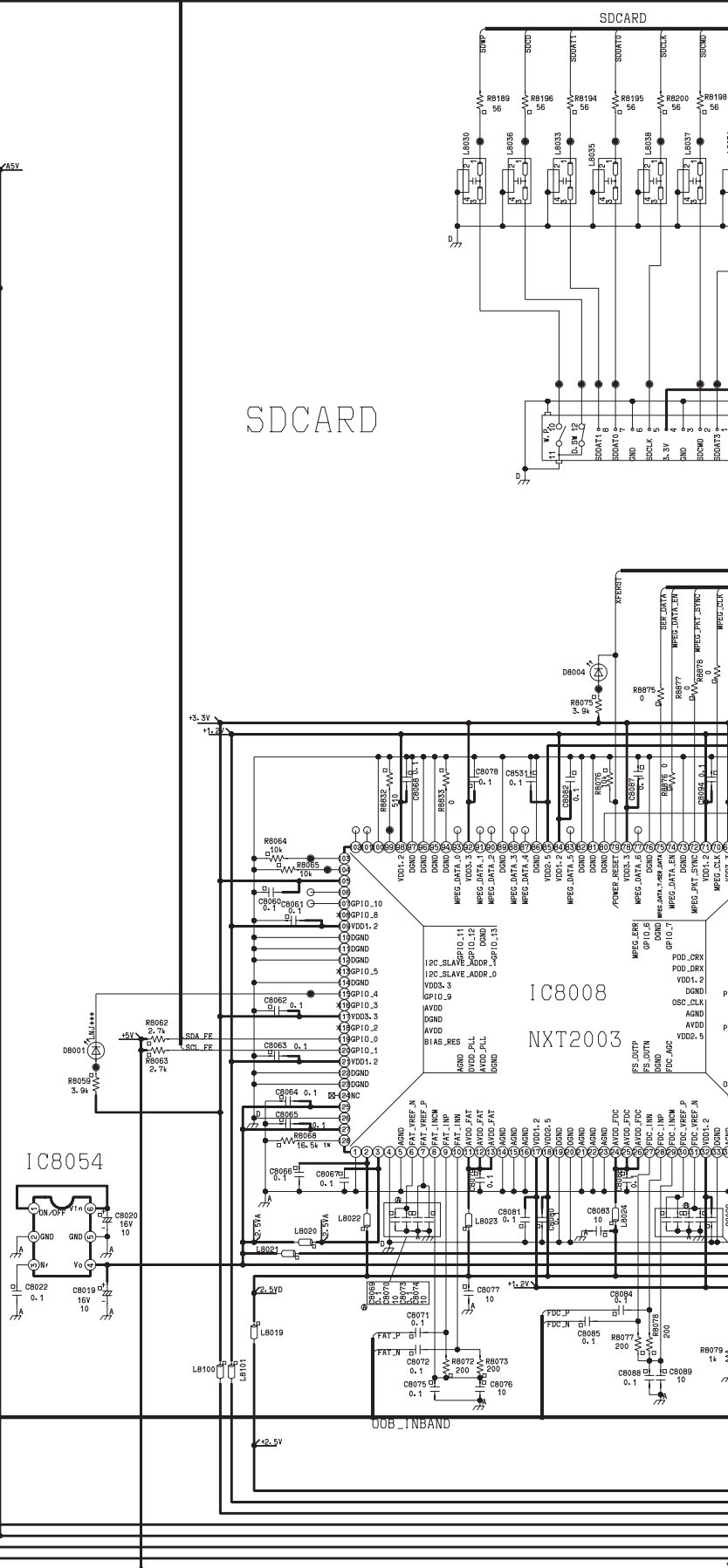
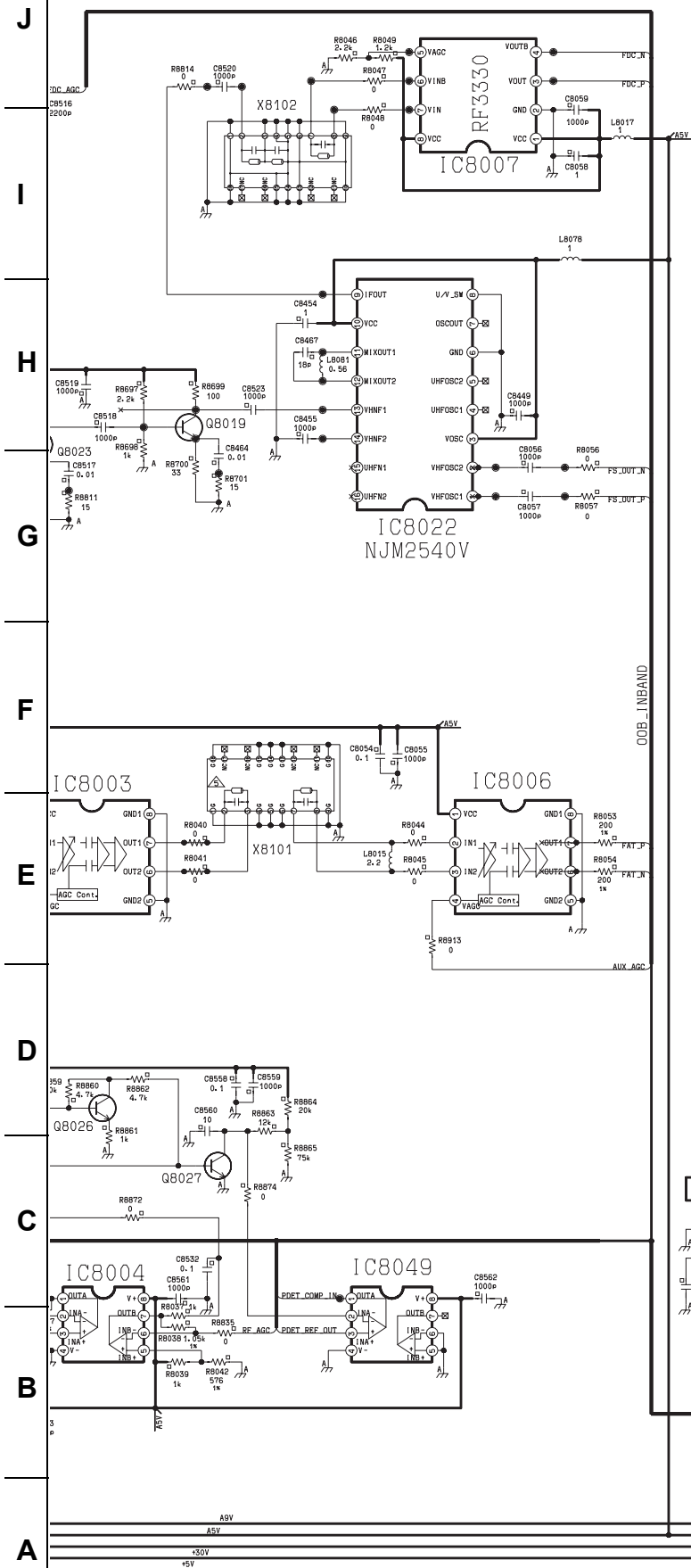




TNP2AA144

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CPU\_BUS

I2C, SERIAL, JTAG

TUNER\_OUT

SDCARD

SDCARD

EEPROM

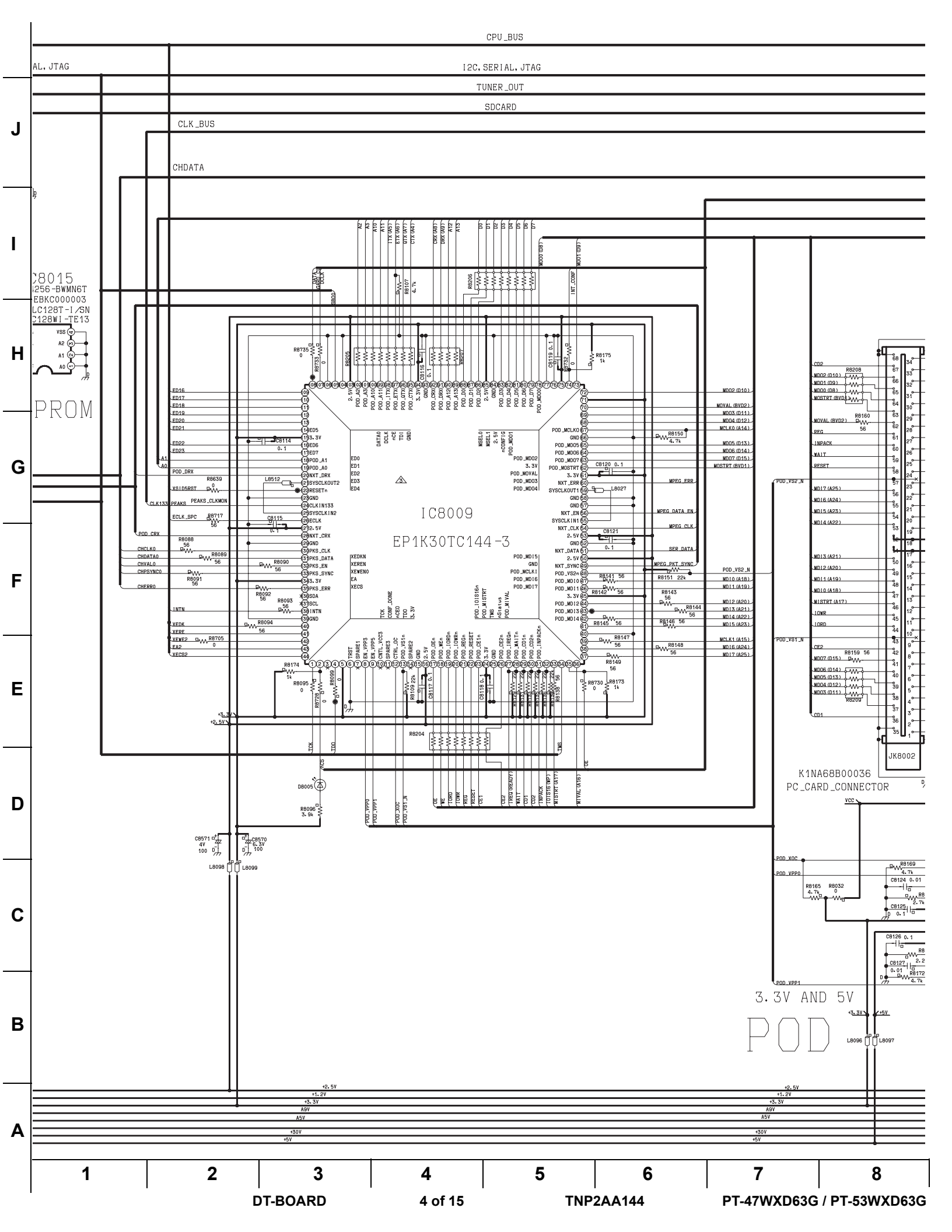
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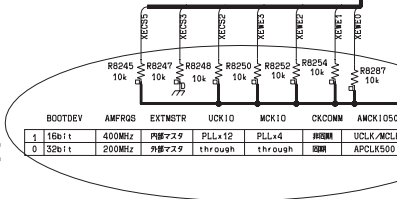
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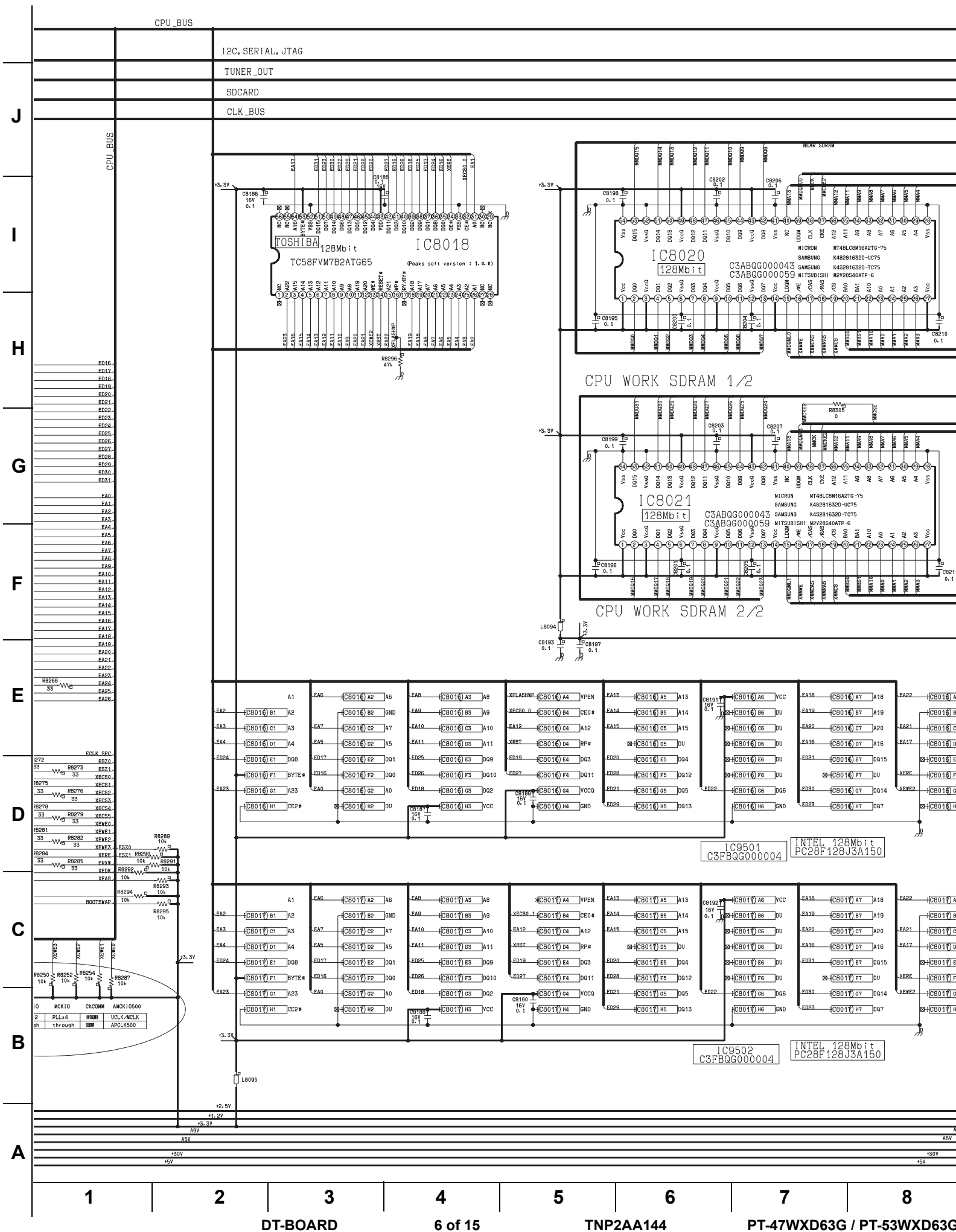
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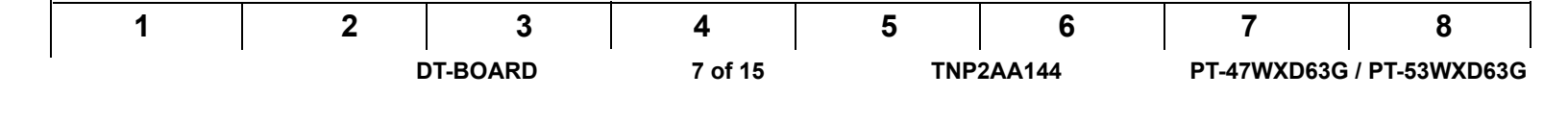
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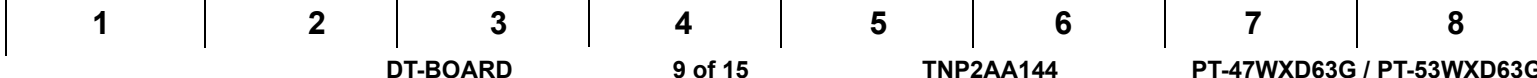


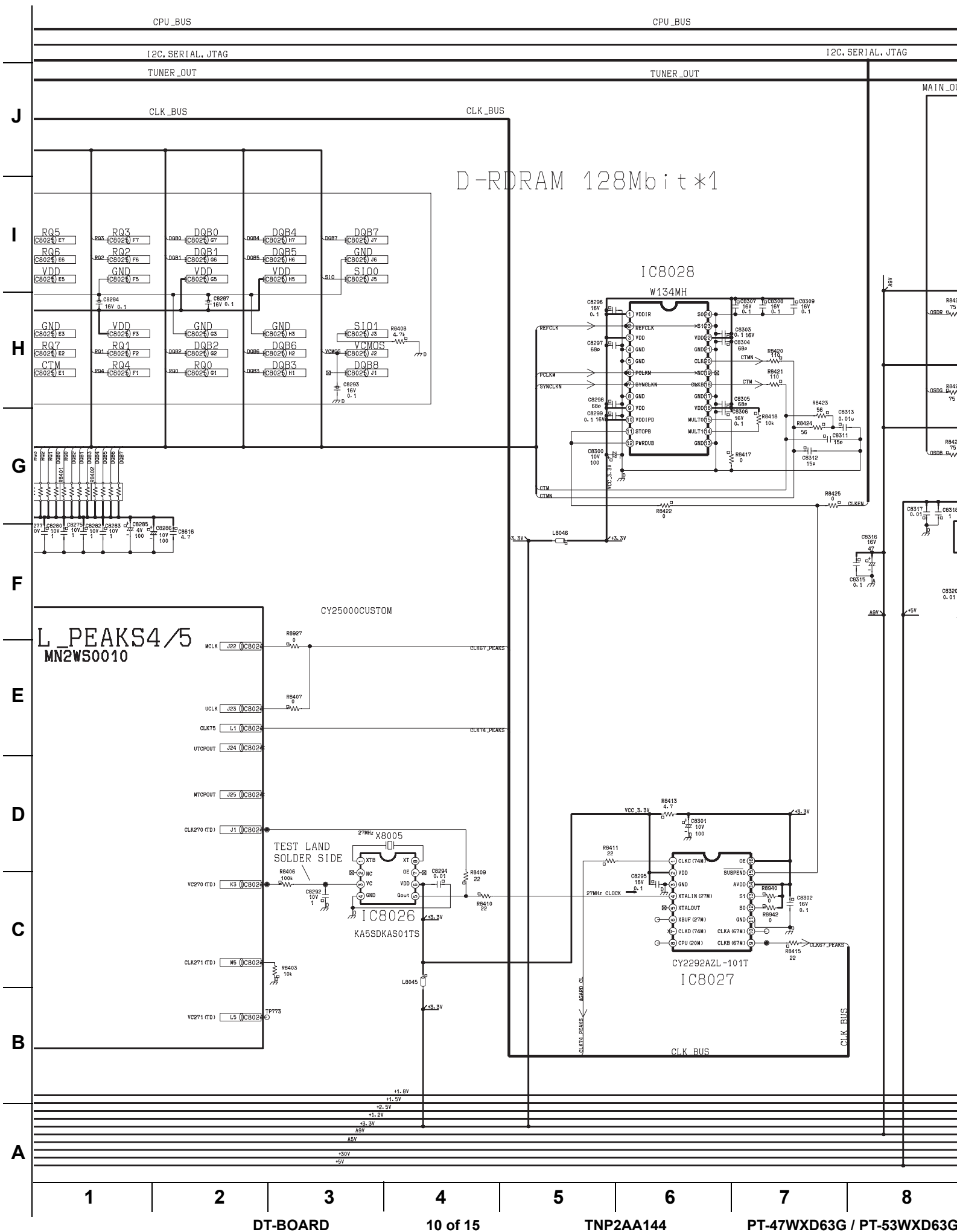


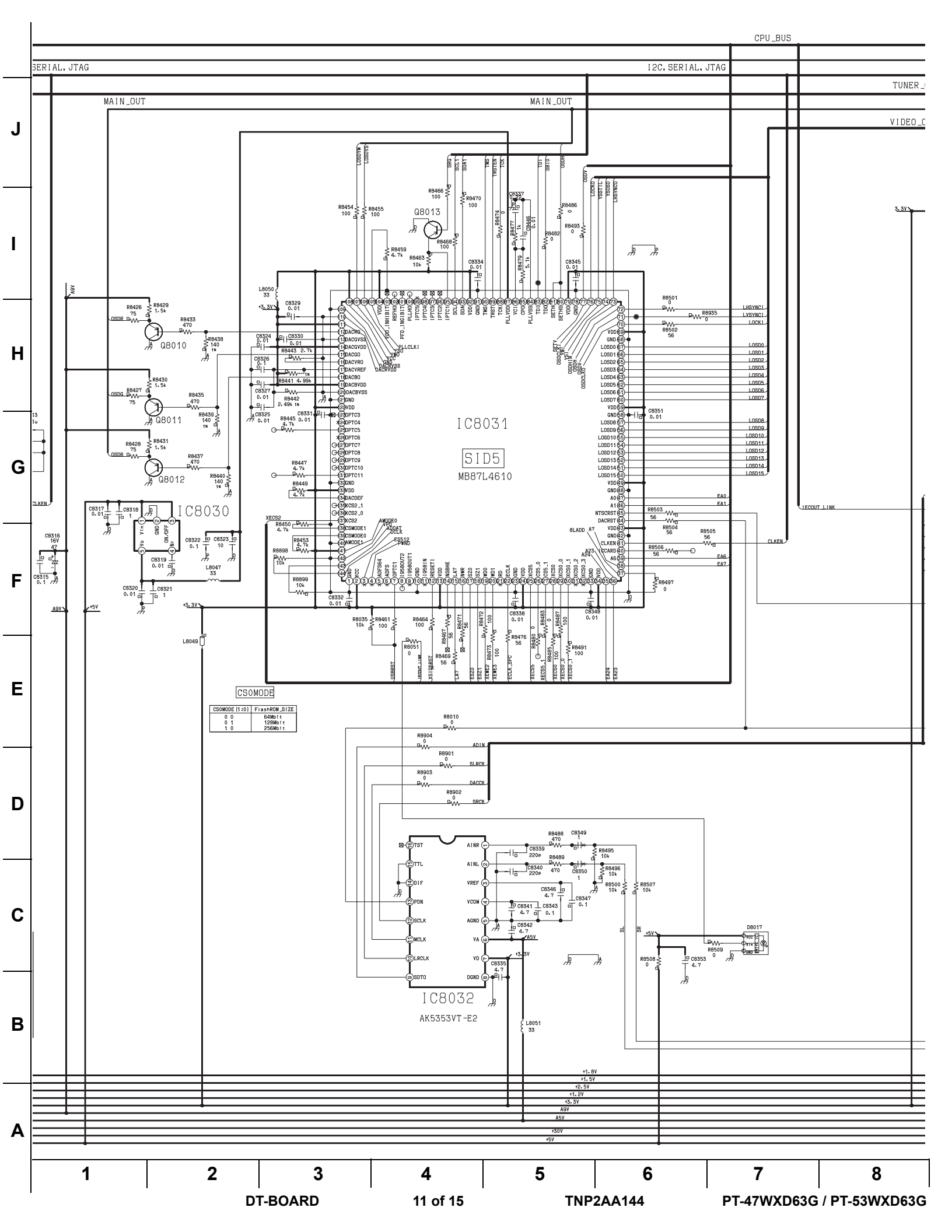


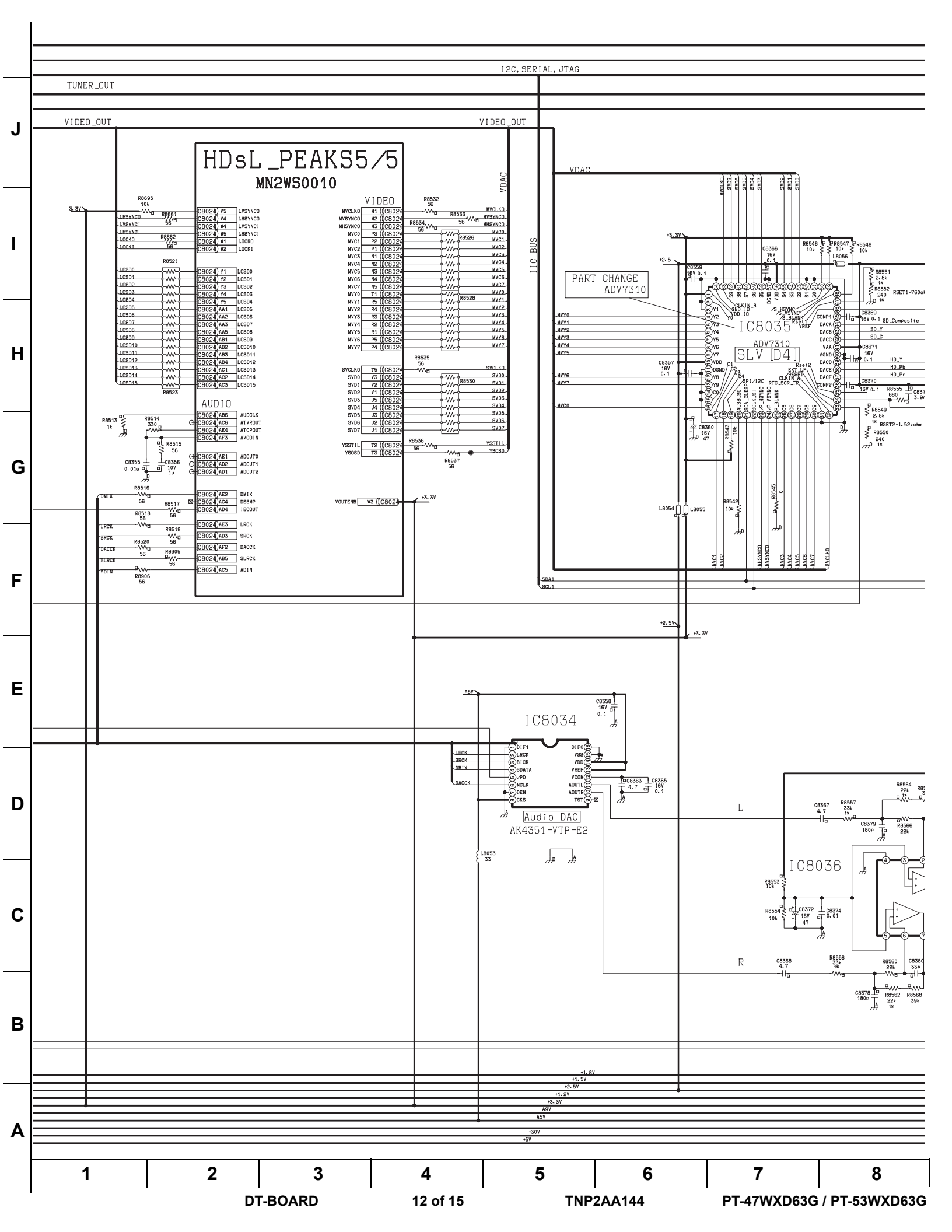












CPU\_BUS

I2C, SERIAL, JTAG

TUNER\_OUT

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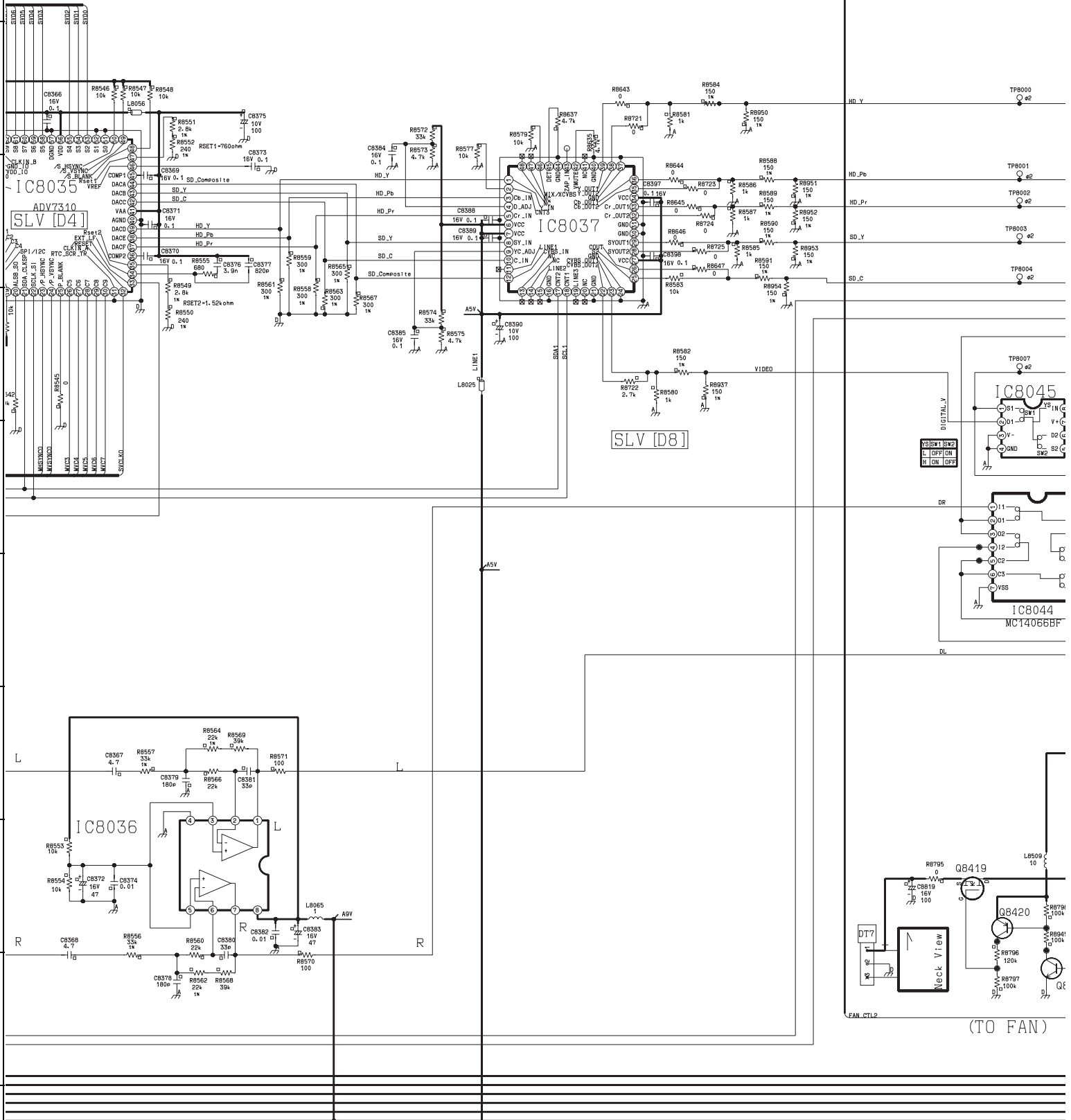
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DT-BOARD

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TNP2AA144

PT-47WXD63G / PT-53WXD63G









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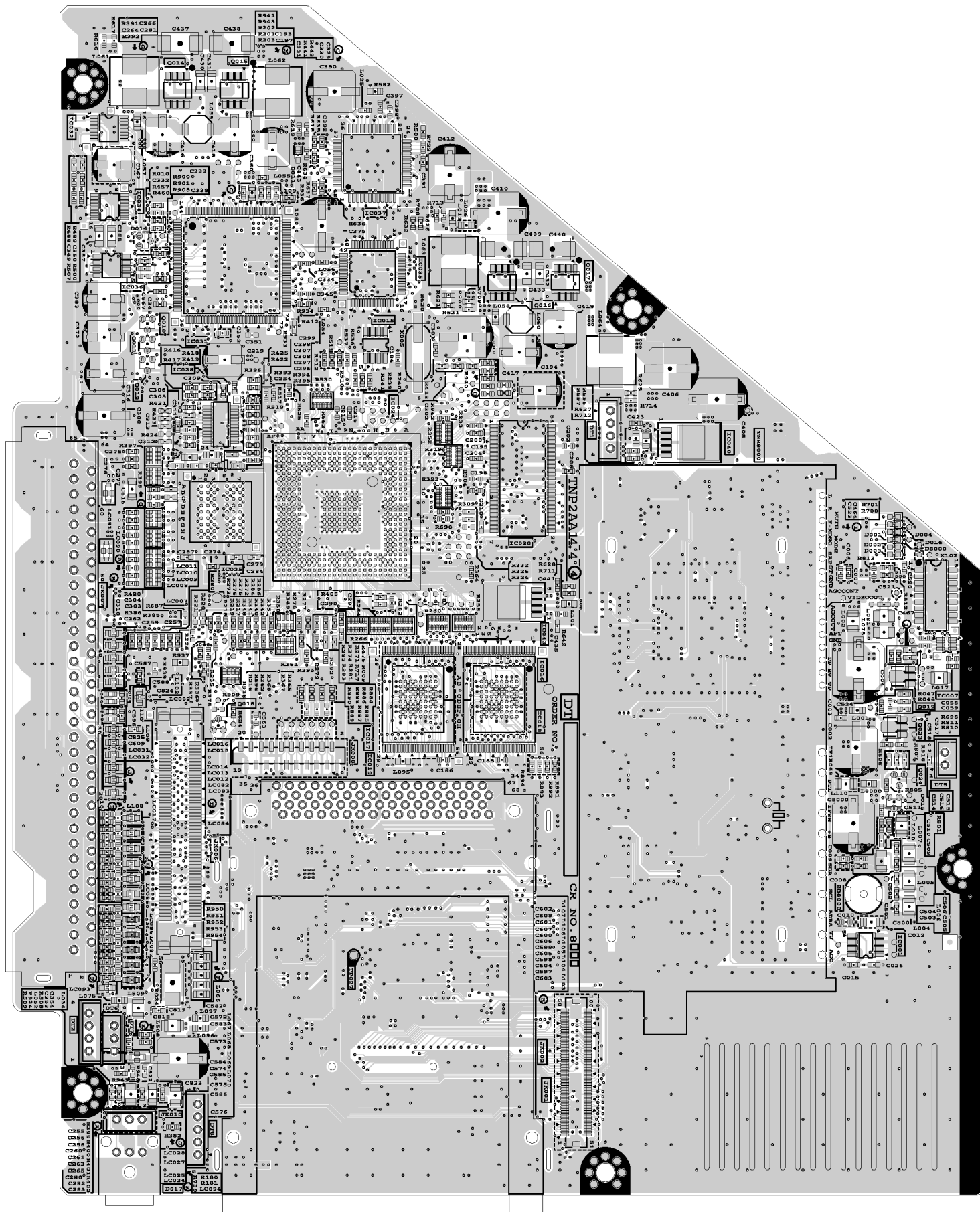
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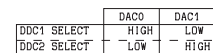
DT-PCB

TOP VIEW

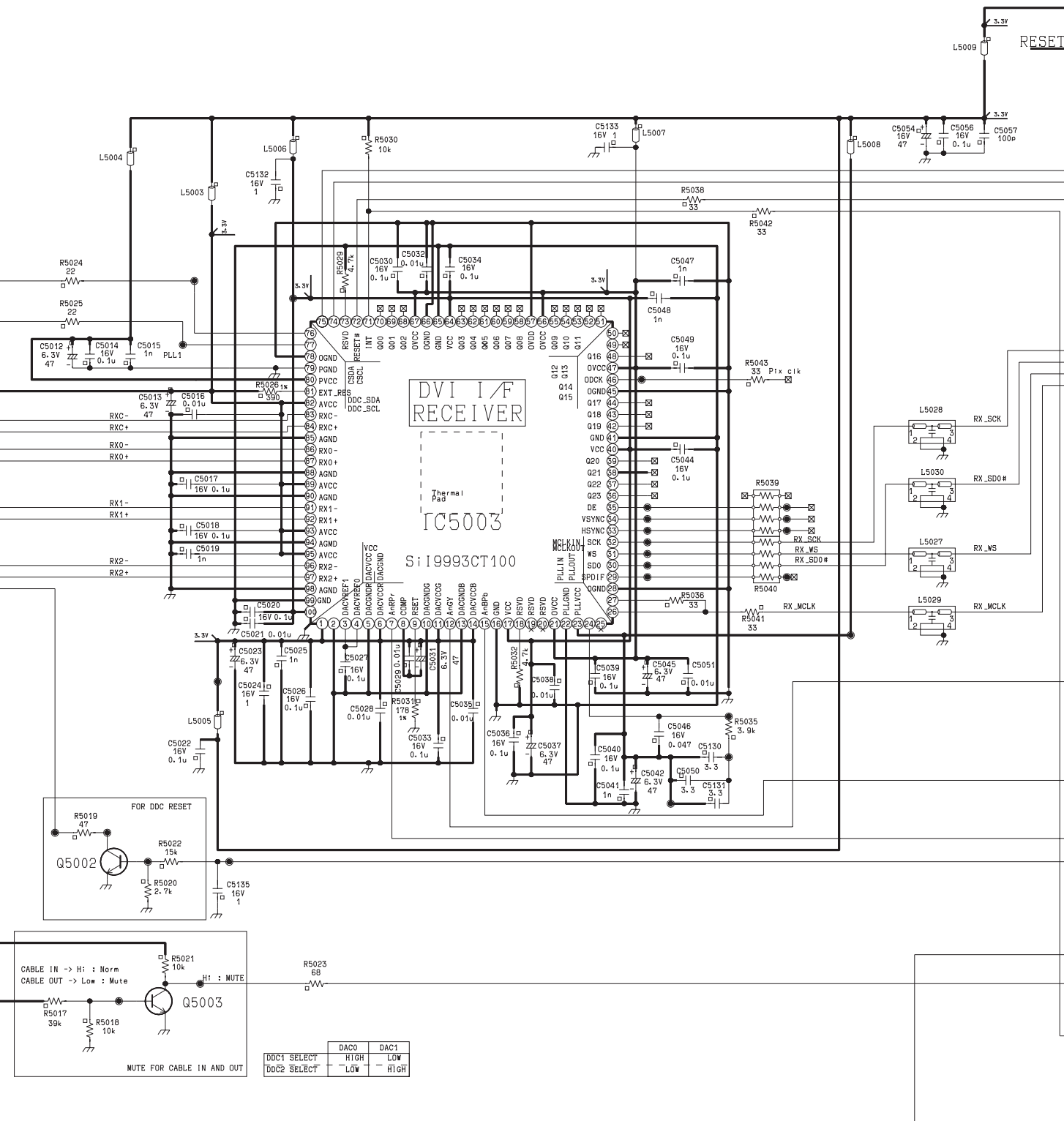
TNP2AA144

PT-47WXD63G / PT-53WXD63G



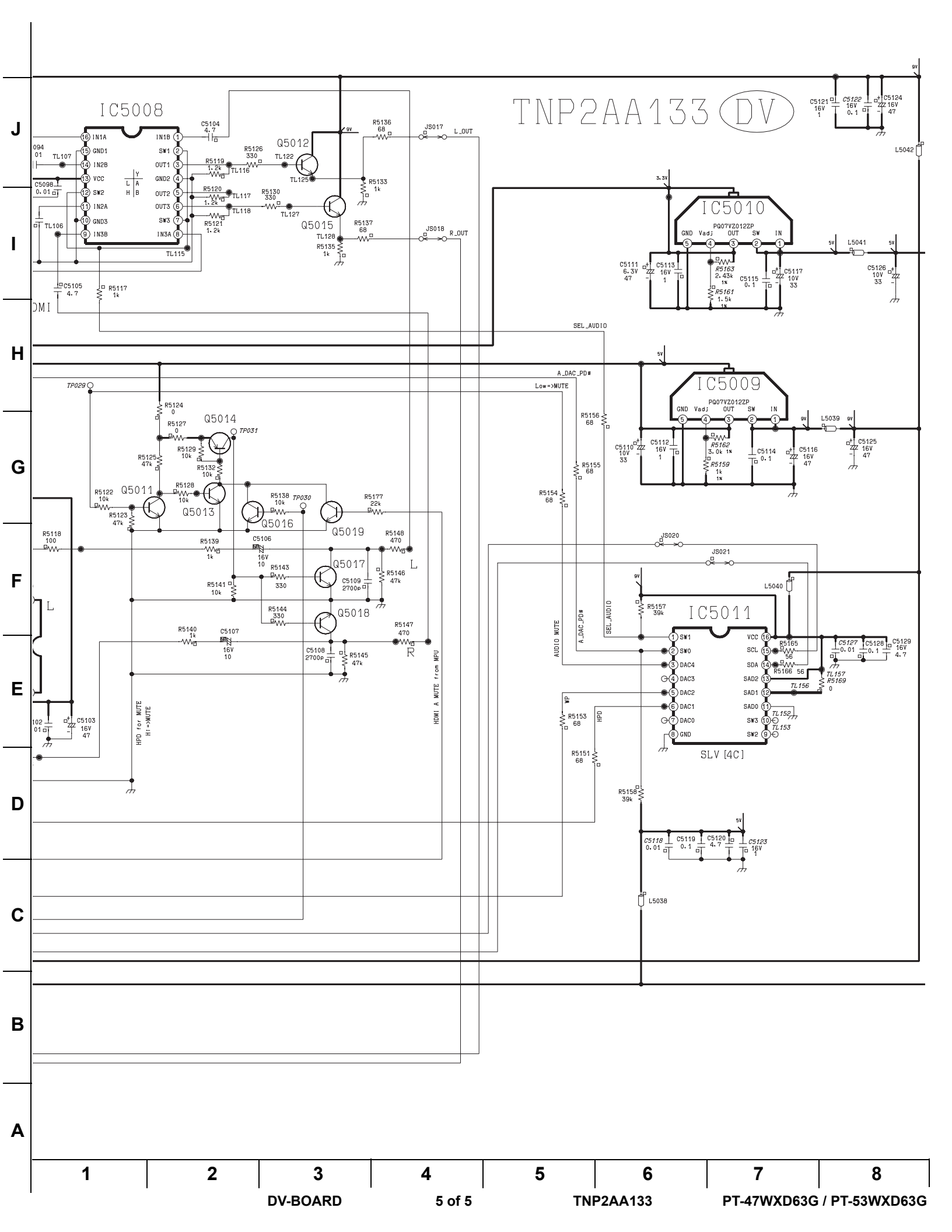


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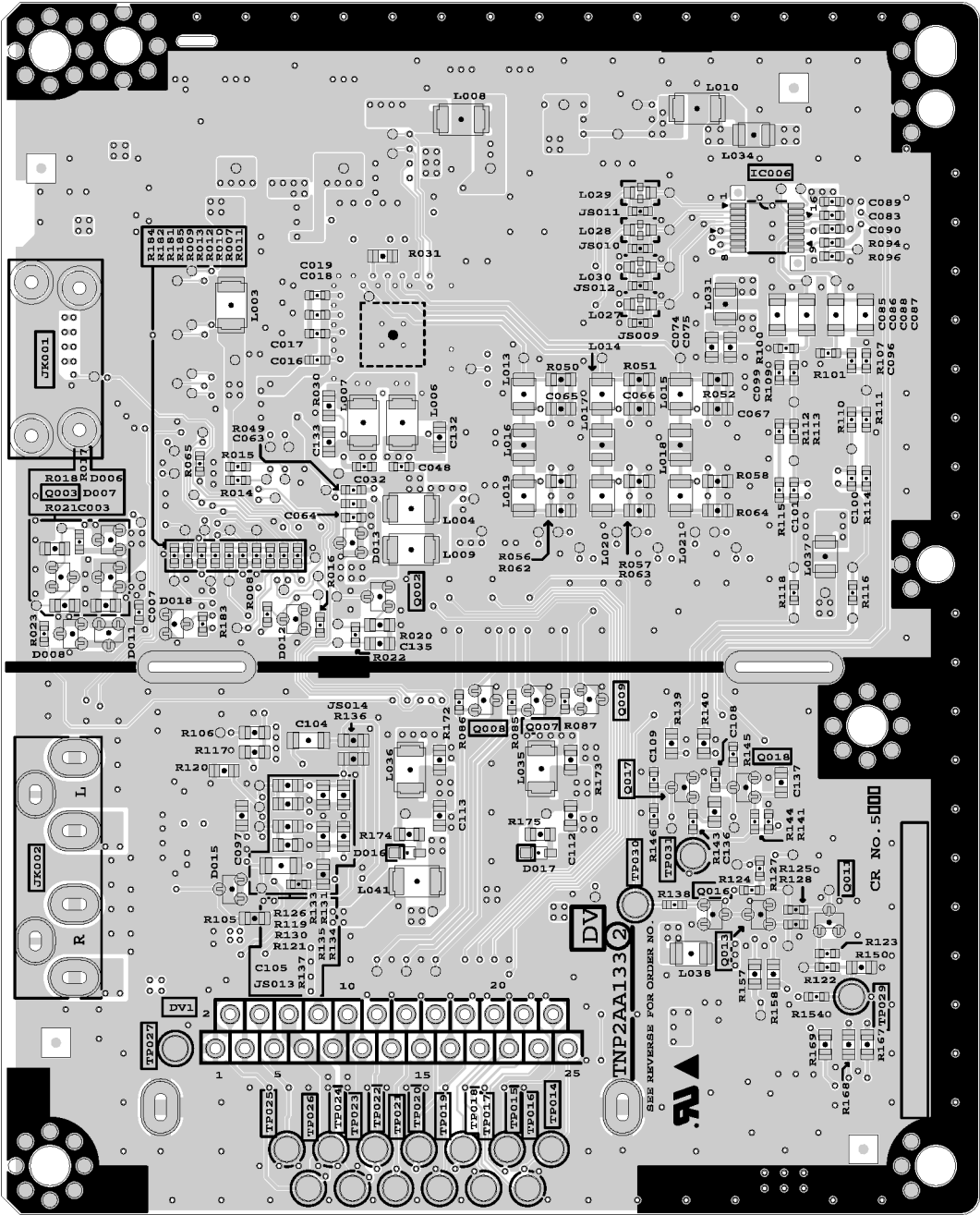
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DV-PCB

BOTTOM VIEW

TNP2AA133

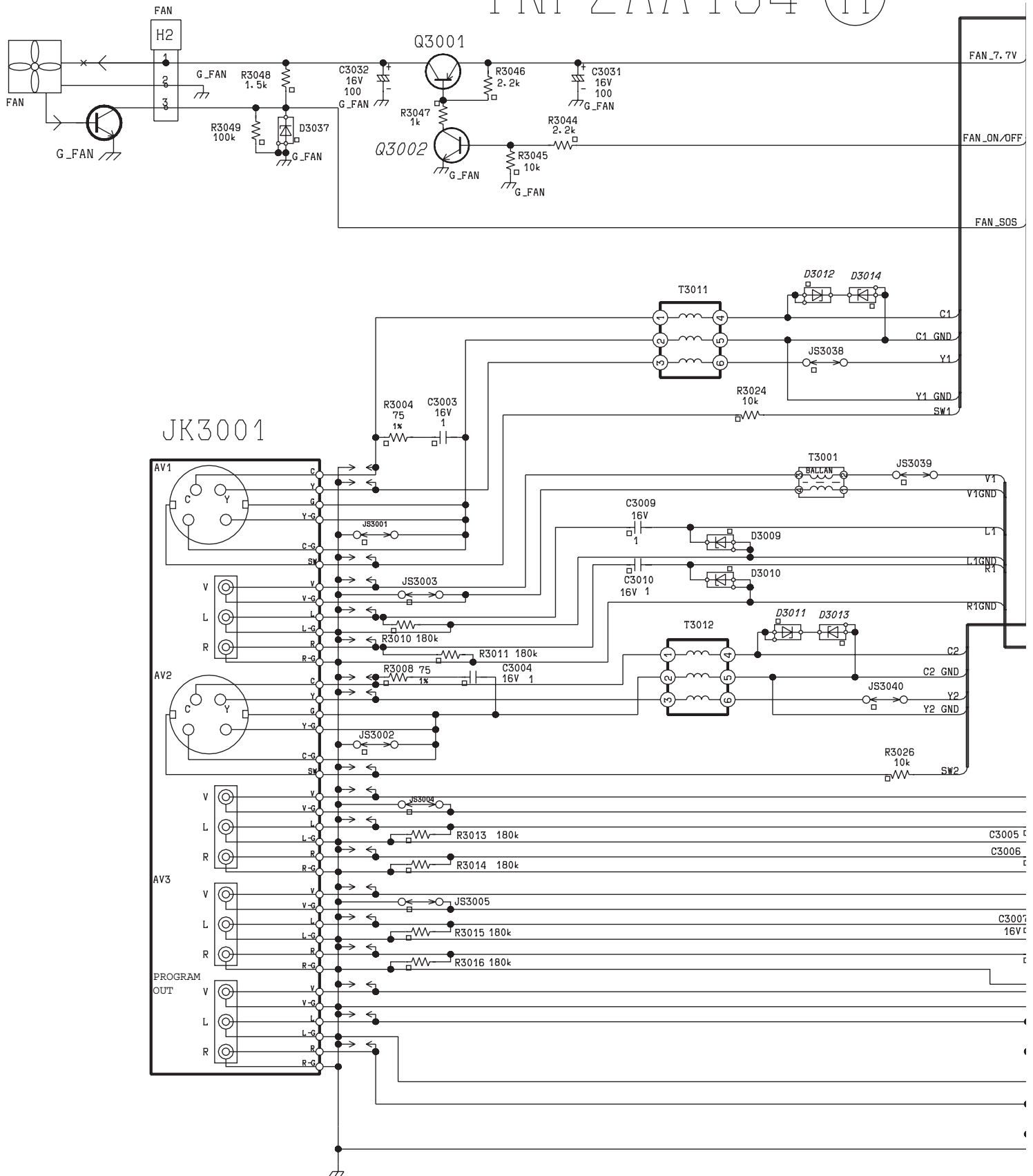
PT-47WXD63G / PT-53WXD63G



# A

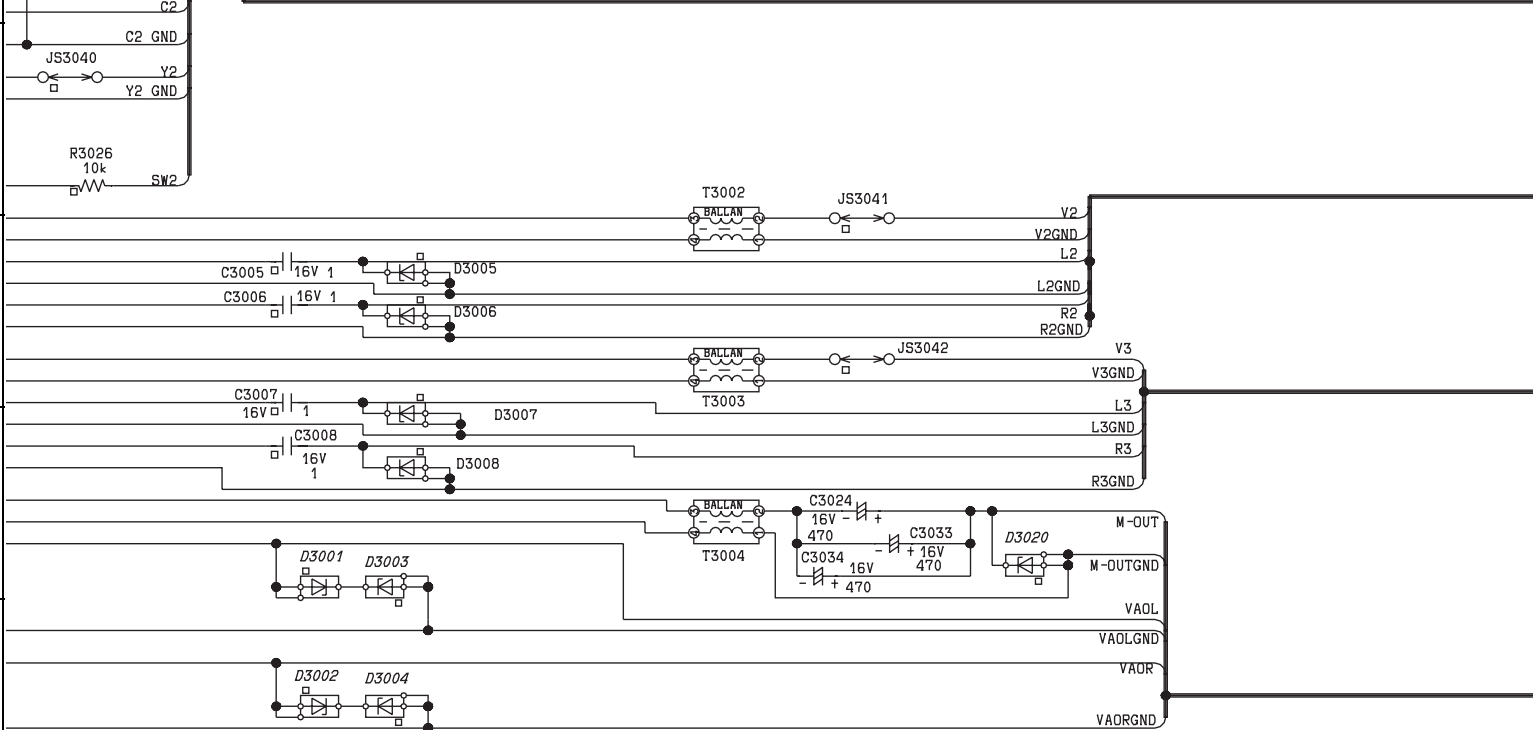
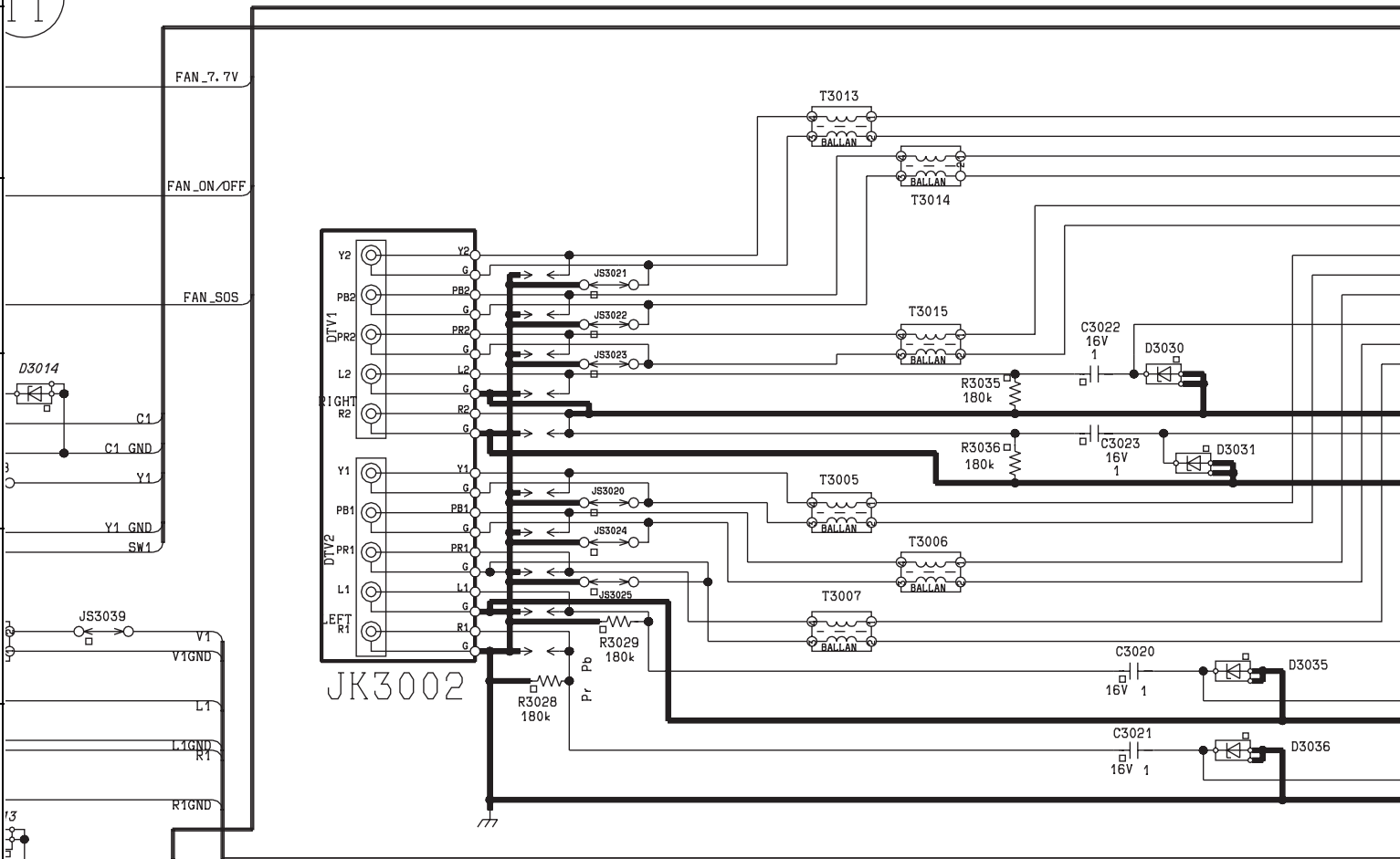


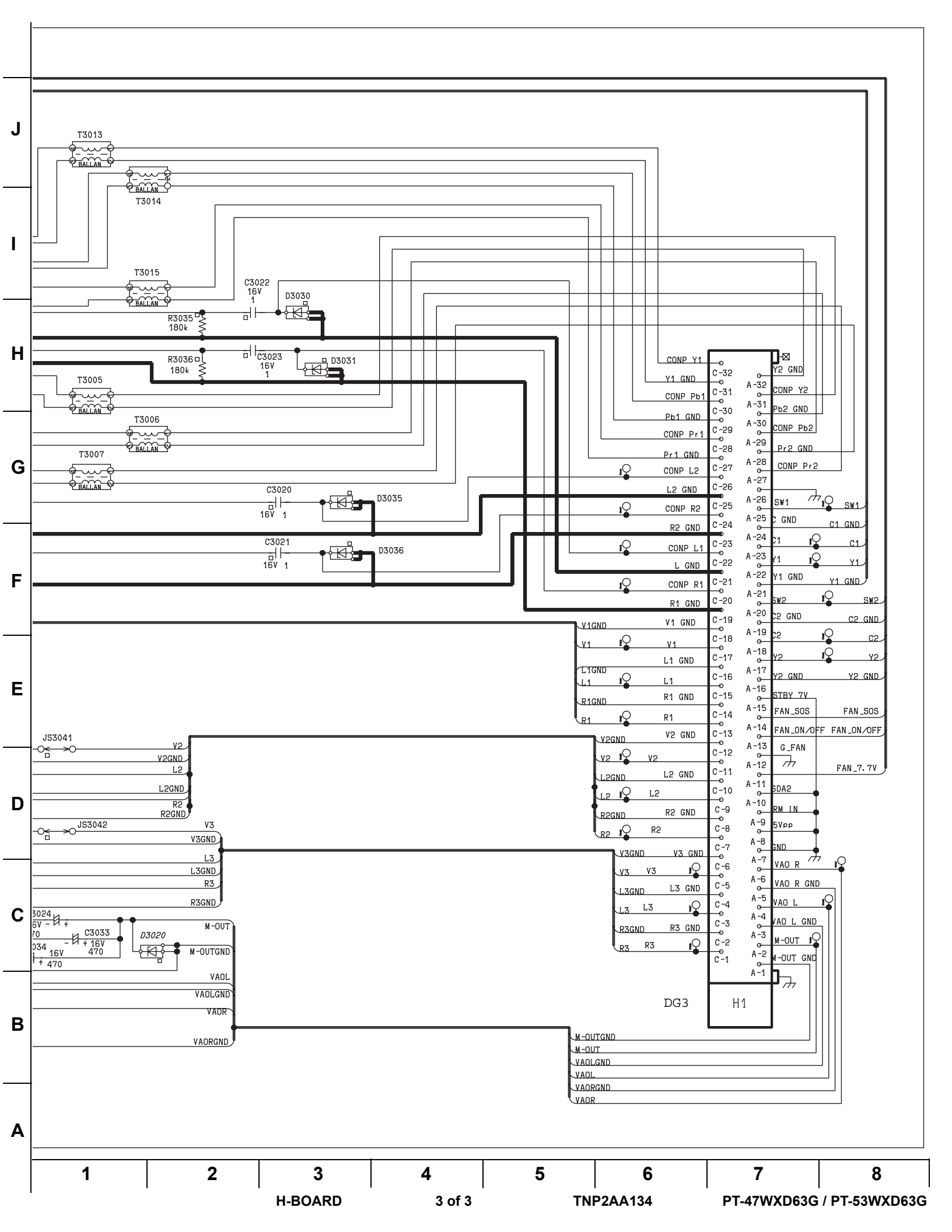
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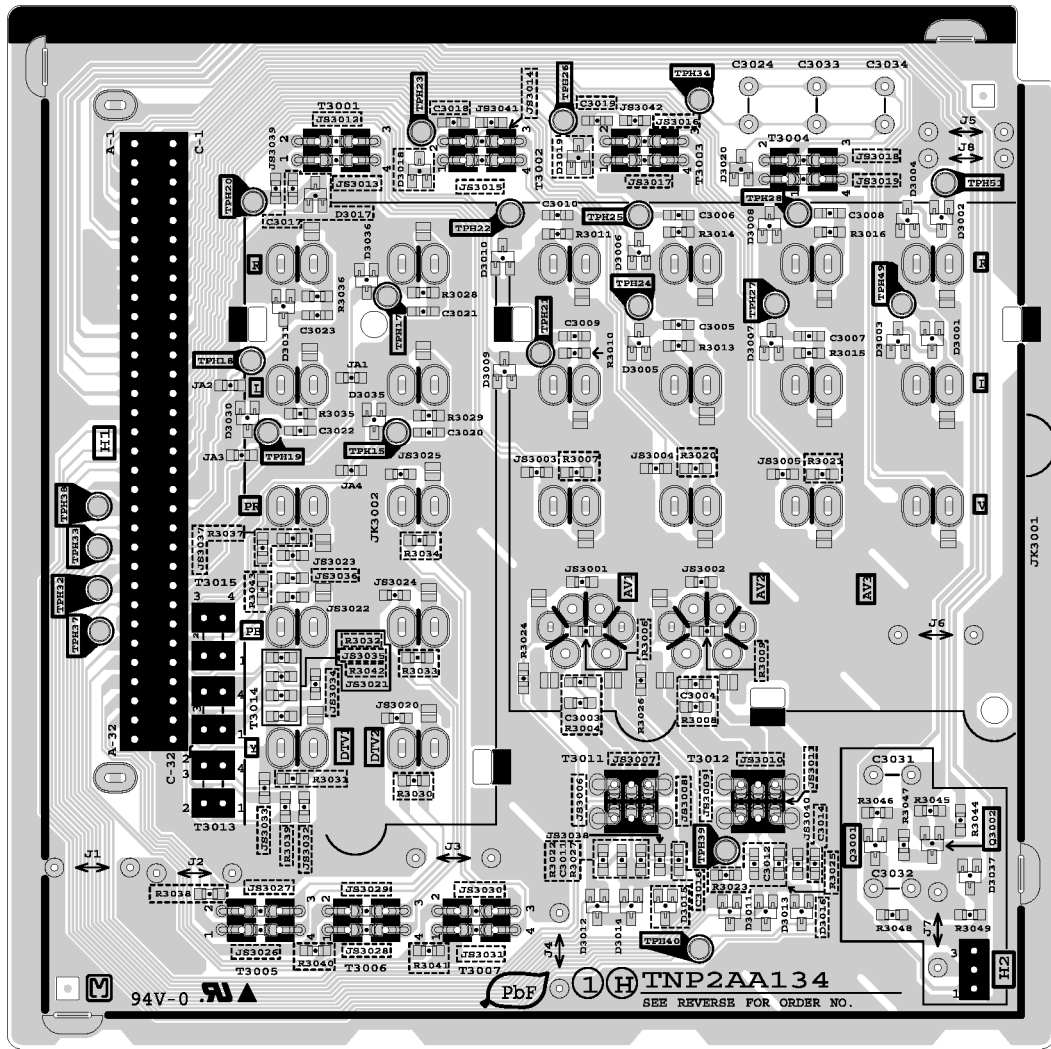


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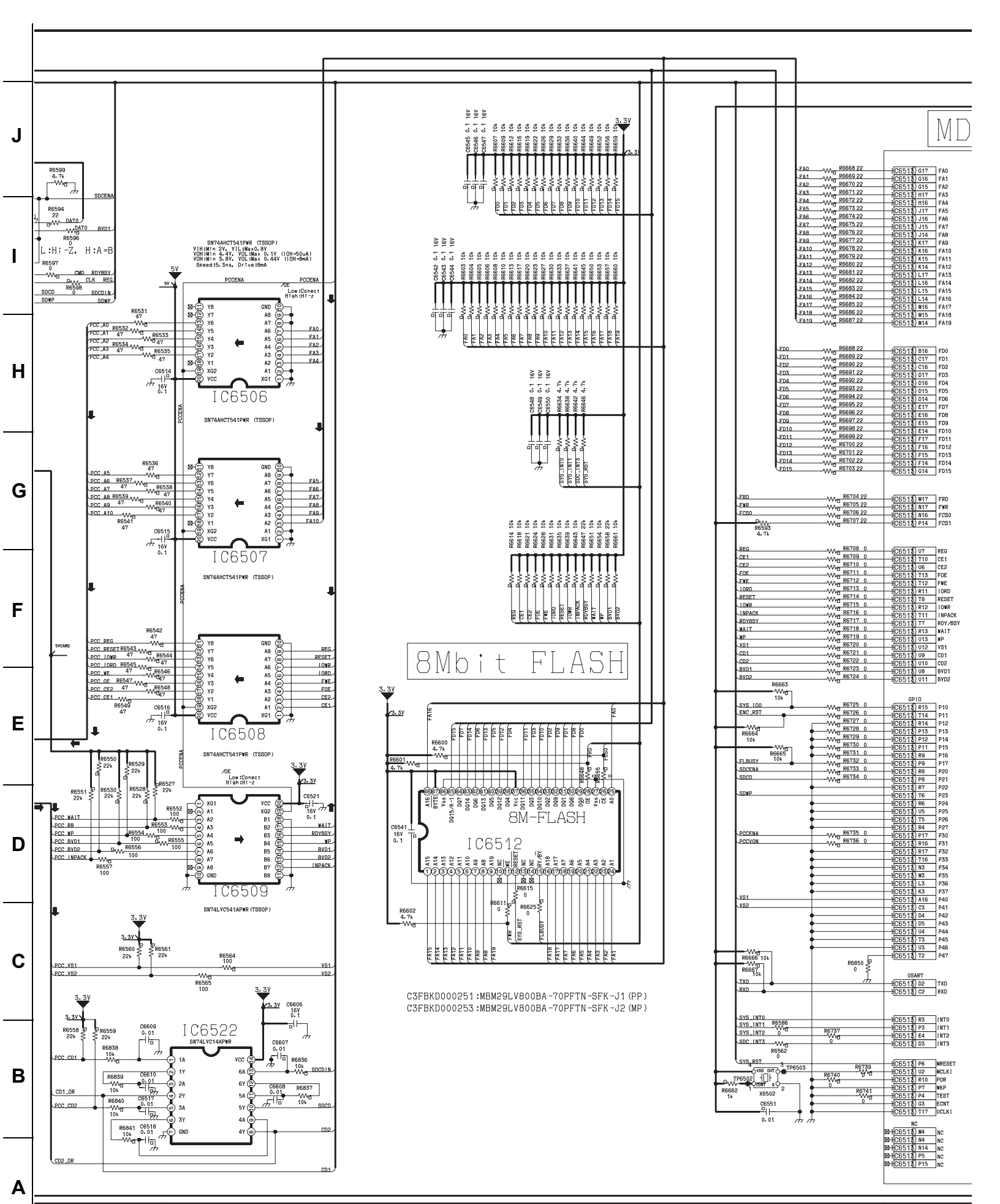


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MD

8Mb FLASH

8M-FLASH

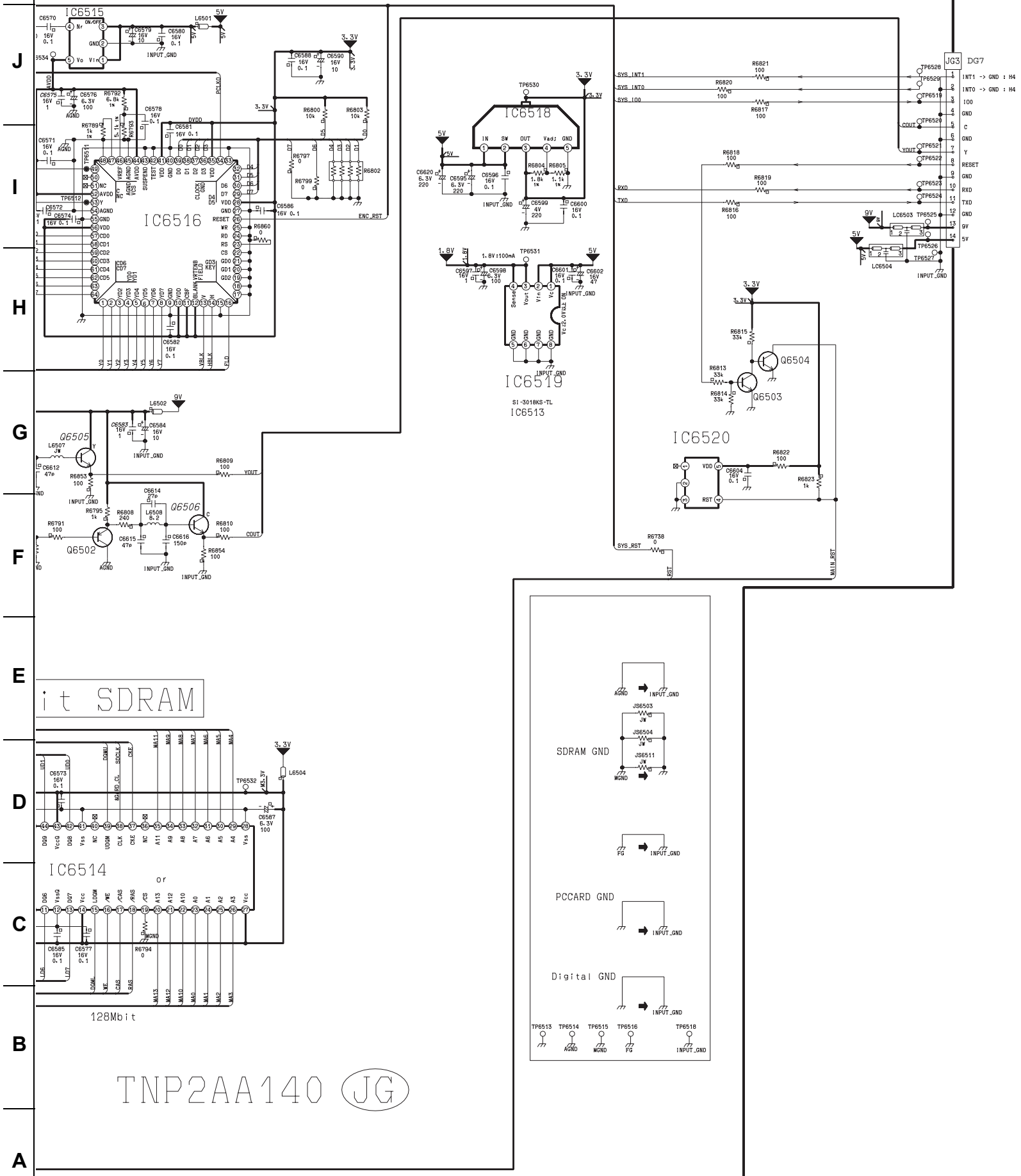
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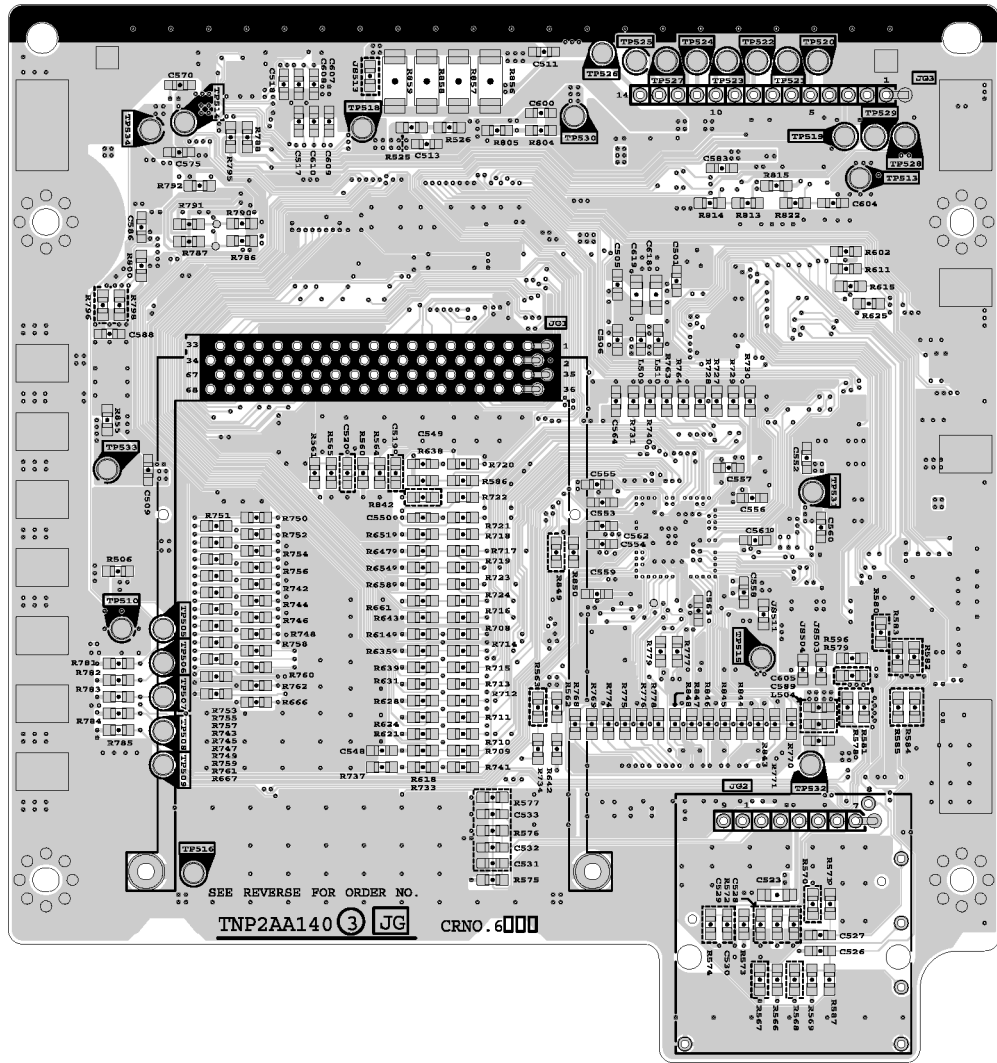
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FA2	Ww	R6670 22	IC6510	G15	FA2
FA3	Ww	R6671 22	IC6510	G14	FA3
FA4	Ww	R6672 22	IC6510	G13	FA4
FA5	Ww	R6673 22	IC6510	G12	FA5
FA6	Ww	R6674 22	IC6510	G11	FA6
FA7	Ww	R6675 22	IC6510	G10	FA7
FA8	Ww	R6676 22	IC6510	G09	FA8
FA9	Ww	R6677 22	IC6510	G08	FA9
FA10	Ww	R6678 22	IC6510	G07	FA10
FA11	Ww	R6679 22	IC6510	G06	FA11
FA12	Ww	R6680 22	IC6510	G05	FA12
FA13	Ww	R6681 22	IC6510	G04	FA13
FA14	Ww	R6682 22	IC6510	G03	FA14
FA15	Ww	R6683 22	IC6510	G02	FA15
FA16	Ww	R6684 22	IC6510	G01	FA16
FA17	Ww	R6685 22	IC6510	G00	FA17
FA18	Ww	R6686 22	IC6510	G00	FA18
FA19	Ww	R6687 22	IC6510	G00	FA19
F00	Ww	R6688 22	IC6510	B16	F00
F01	Ww	R6689 22	IC6510	B17	F01
F02	Ww	R6690 22	IC6510	B18	F02
F03	Ww	R6691 22	IC6510	B19	F03
F04	Ww	R6692 22	IC6510	B20	F04
F05	Ww	R6693 22	IC6510	B21	F05
F06	Ww	R6694 22	IC6510	B22	F06
F07	Ww	R6695 22	IC6510	B23	F07
F08	Ww	R6696 22	IC6510	B24	F08
F09	Ww	R6697 22	IC6510	B25	F09
F10	Ww	R6698 22	IC6510	B26	F10
F11	Ww	R6699 22	IC6510	B27	F11
F12	Ww	R6700 22	IC6510	B28	F12
F13	Ww	R6701 22	IC6510	B29	F13
F14	Ww	R6702 22	IC6510	B30	F14
F15	Ww	R6703 22	IC6510	B31	F15
	Ww	R6704 22	IC6510	B32	
	Ww	R6705 22	IC6510	B33	
	Ww	R6706 22	IC6510	B34	
	Ww	R6707 22	IC6510	B35	
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	Ww	R6710 0	IC6510	T11	CE2
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	Ww	R6781 0	IC6510	T82	LD68
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	Ww	R6895 0	IC6510	T196	LD182
	Ww	R6896 0	IC6510	T197	LD183
	Ww	R6897 0	IC6510	T198	LD1





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SEE REVERSE FOR ORDER NO.

TNP2AA140 ③ JG

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JG-PCB

BOTTOM VIEW

TNP2AA140

PT-47WXD63G / PT-53WXD63G

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**H**

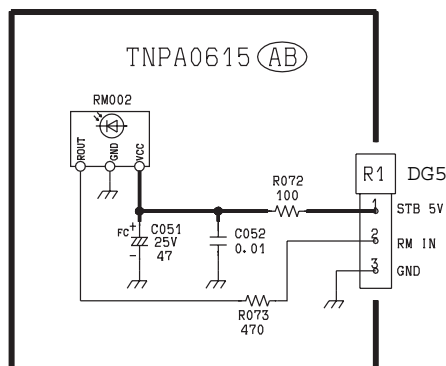
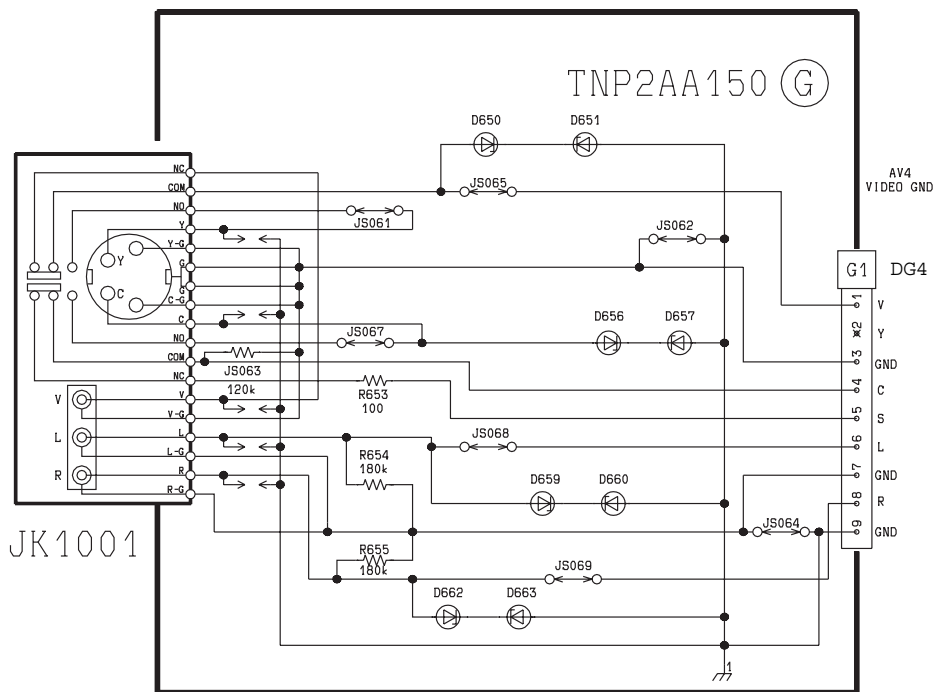
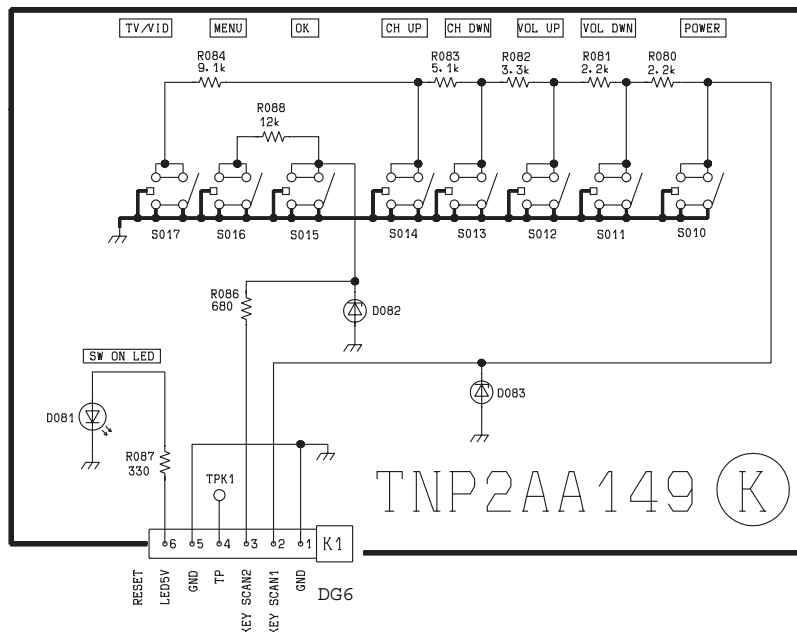
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**I**

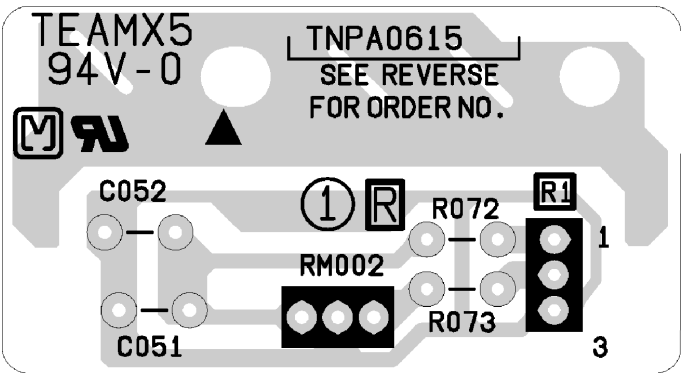
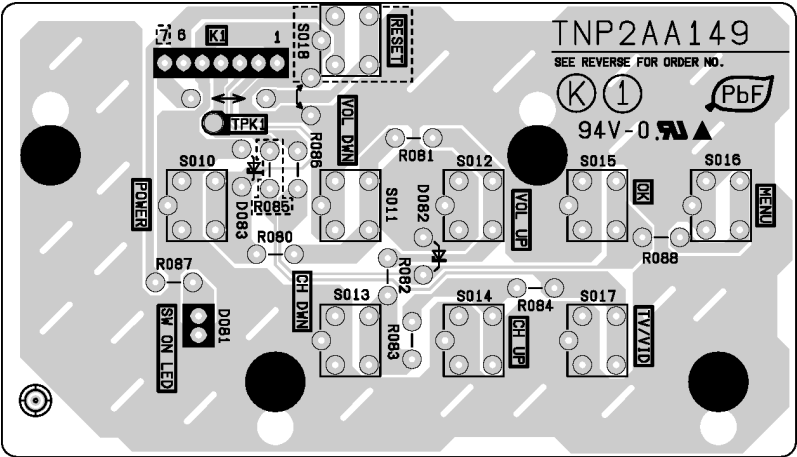
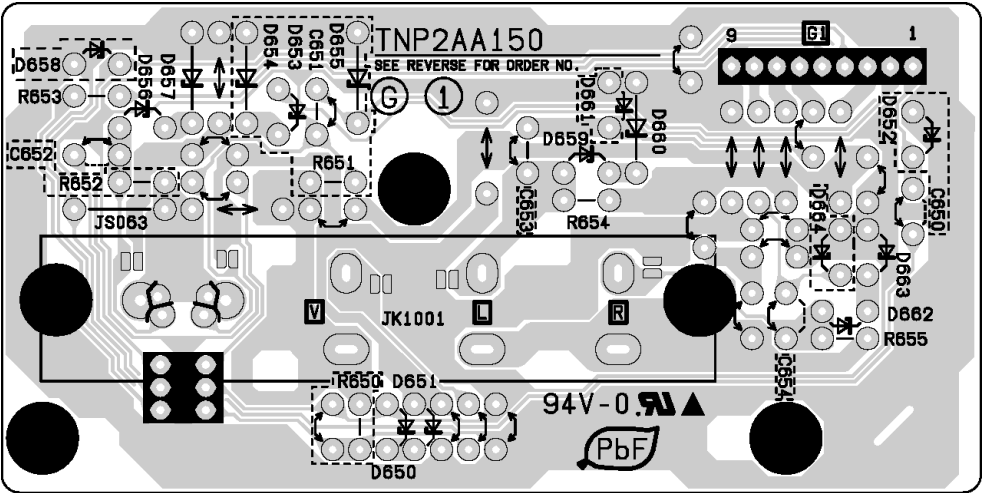
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**J**

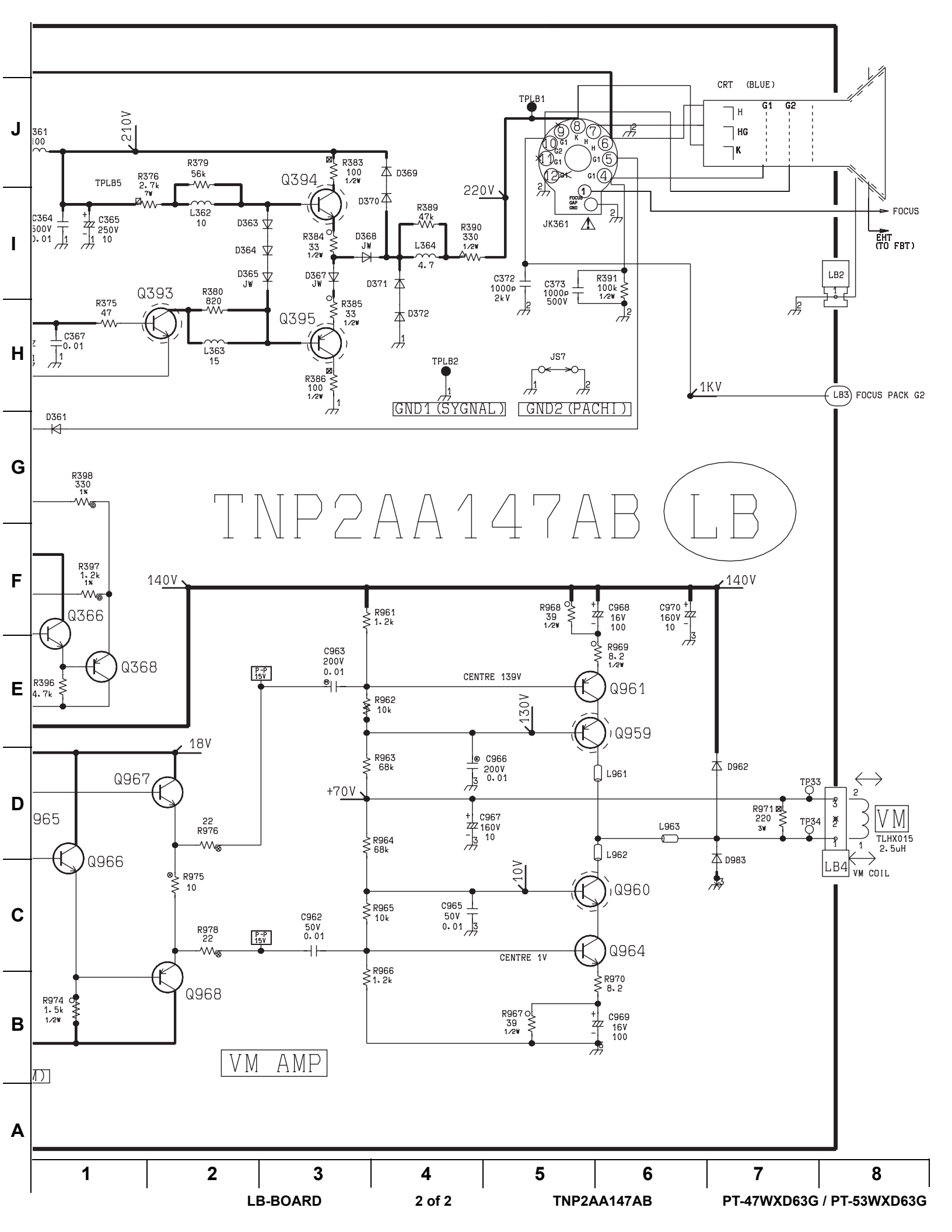
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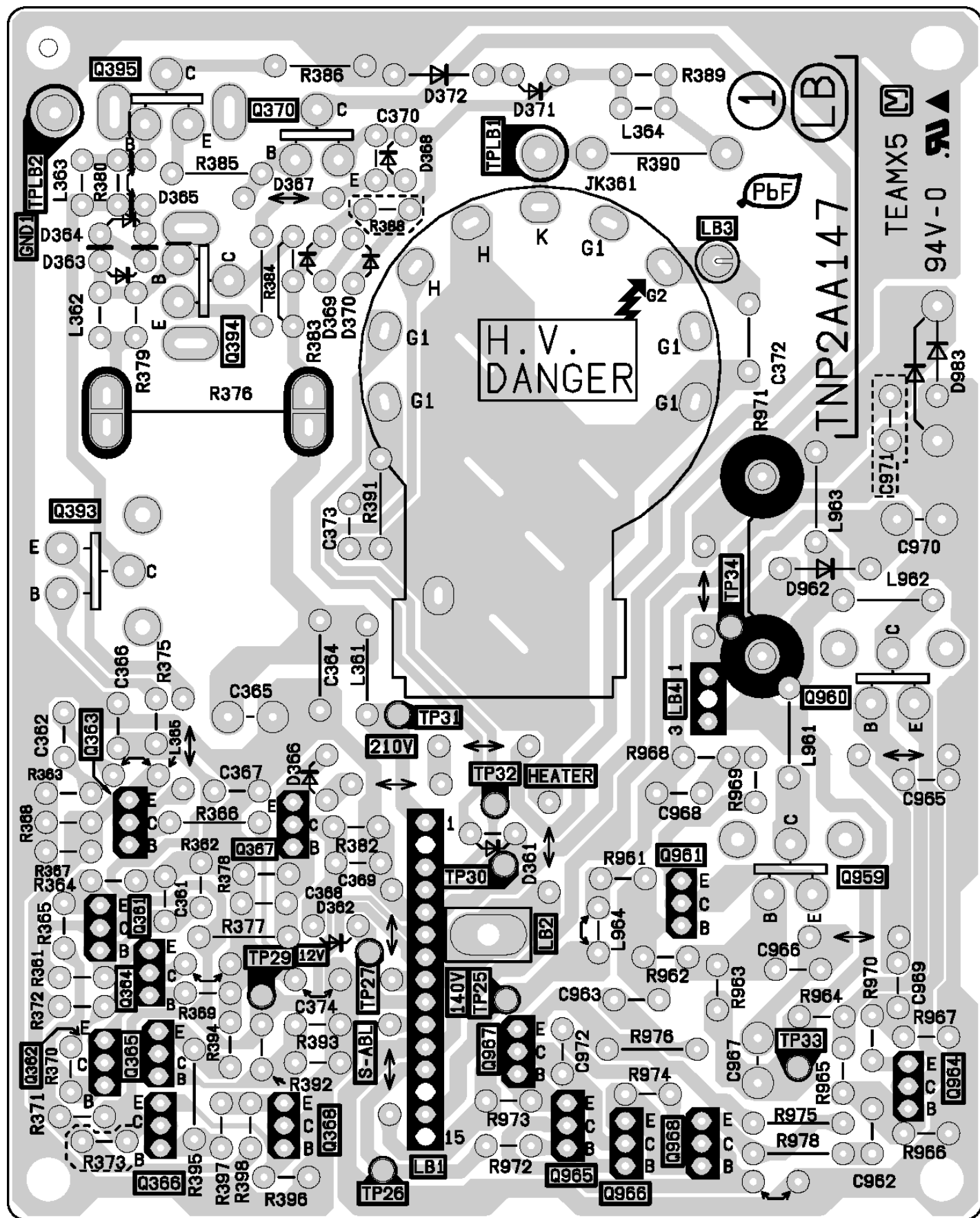


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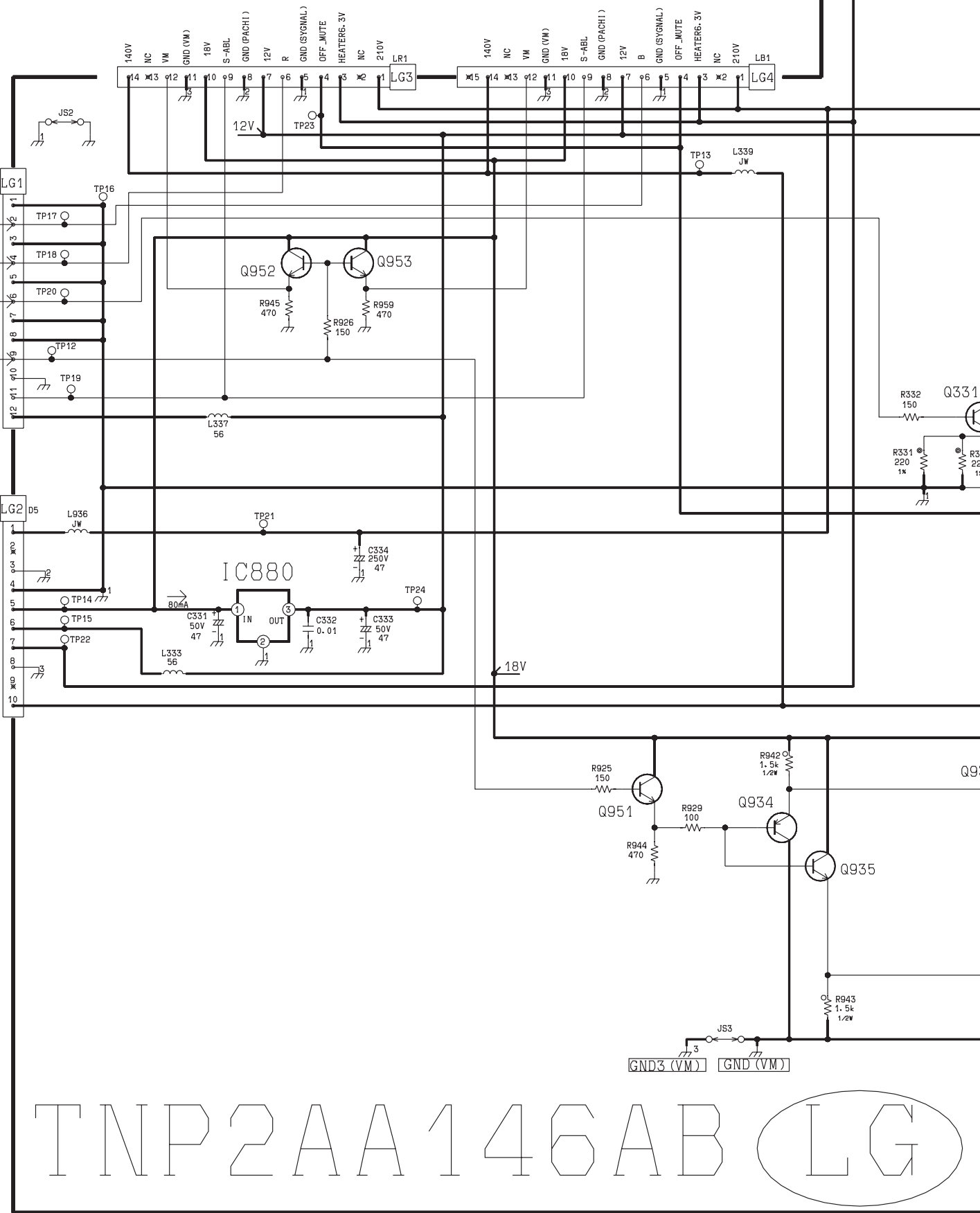




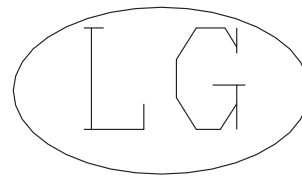




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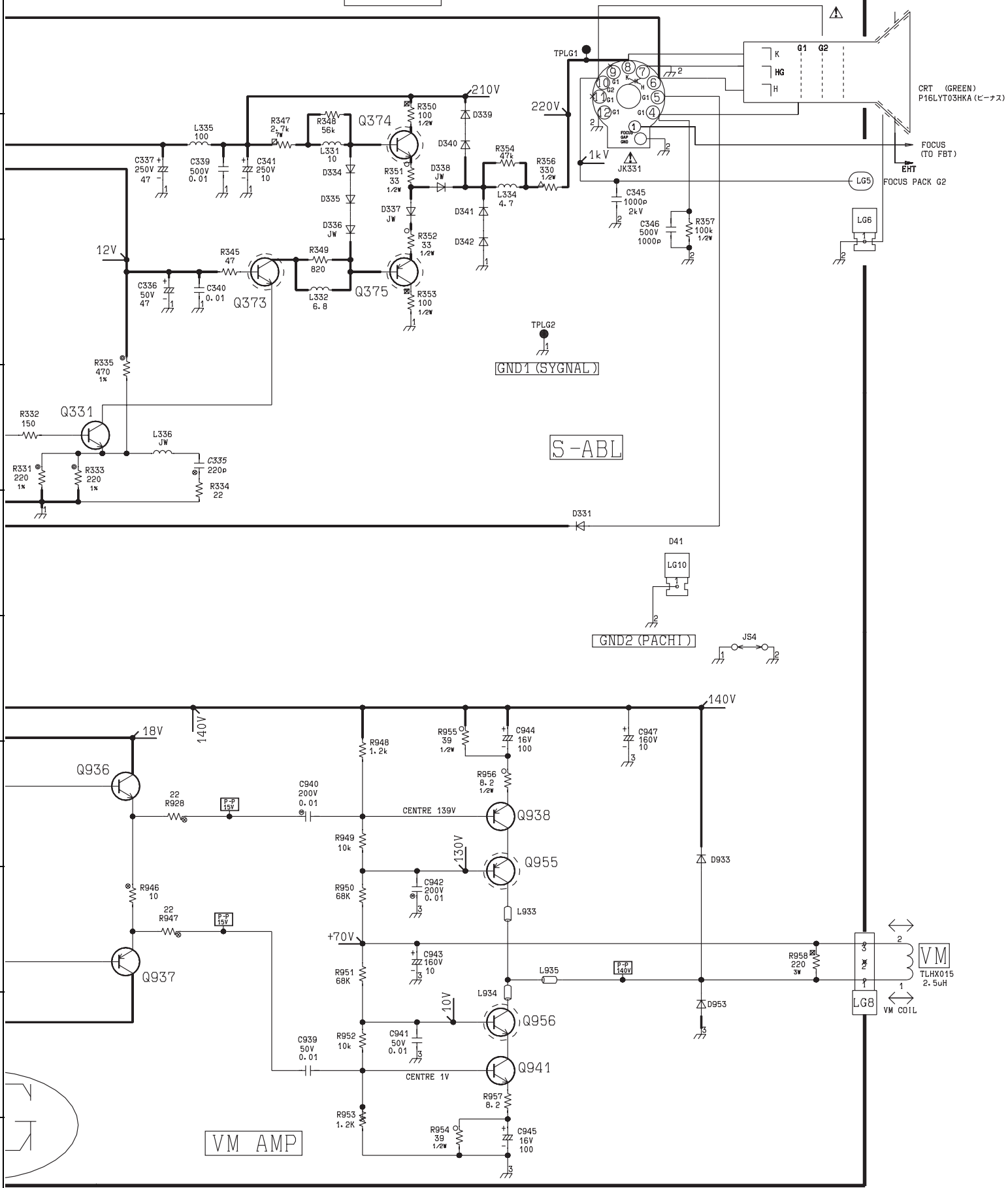


TNP2AA146AB



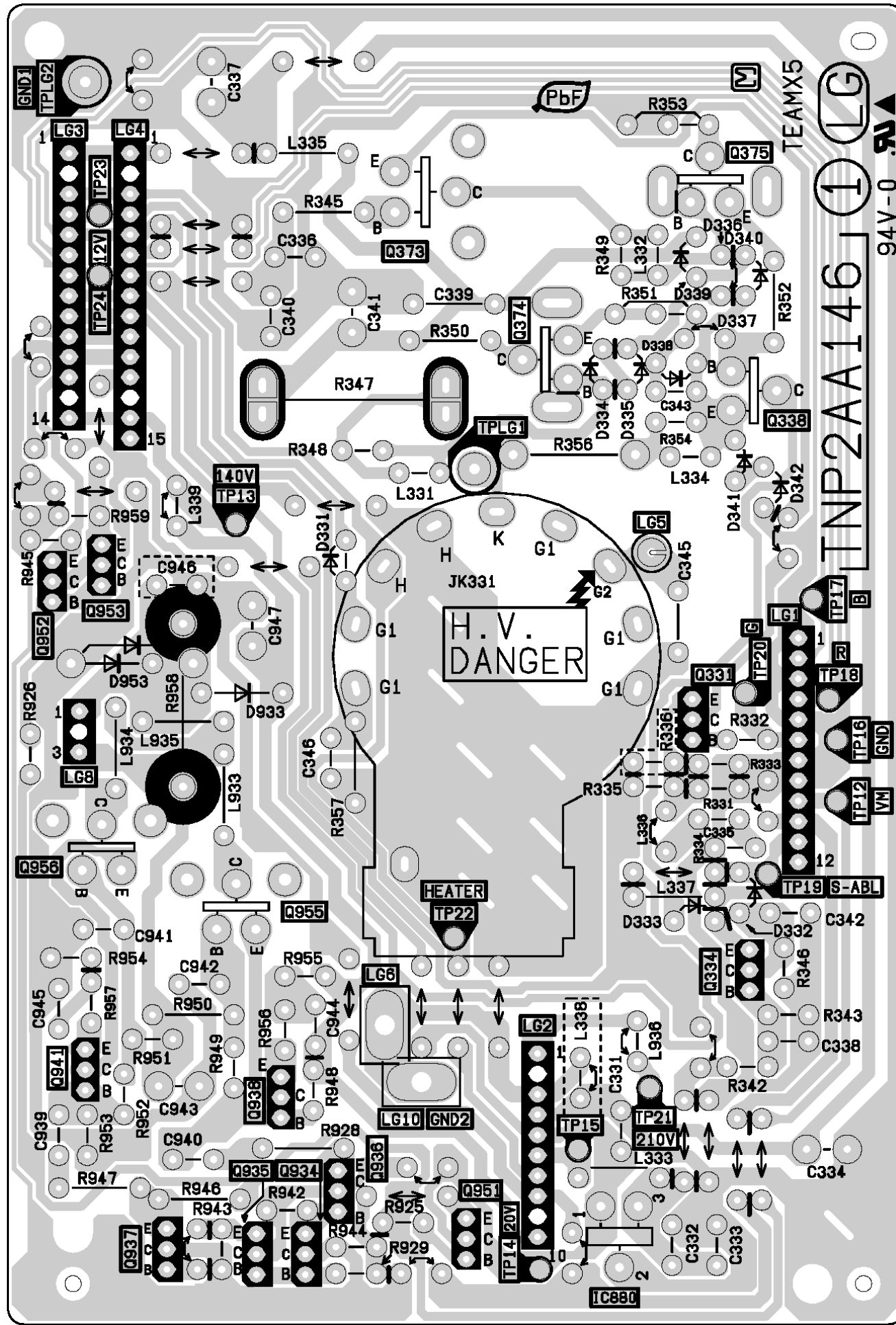
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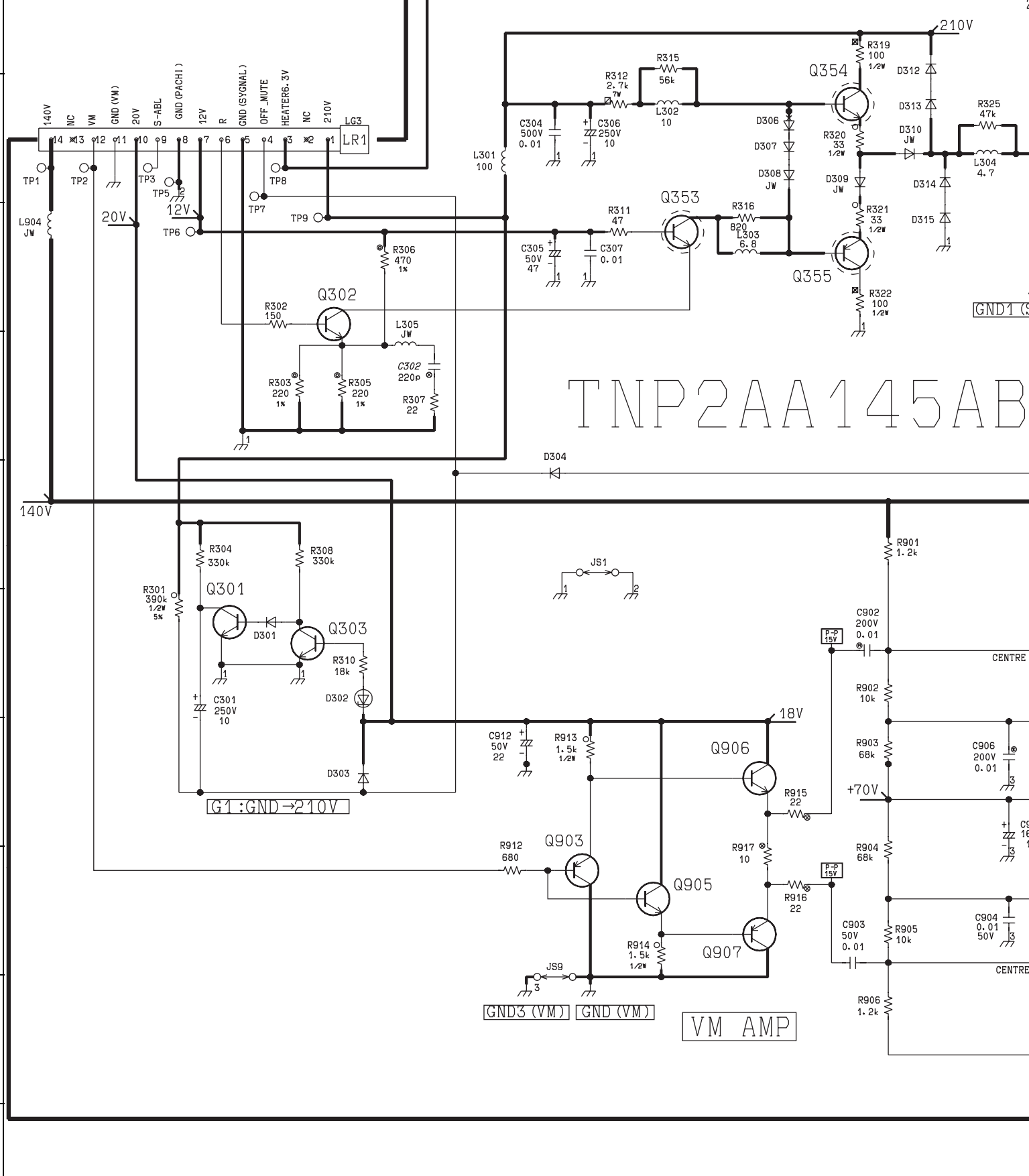
TEAMX5

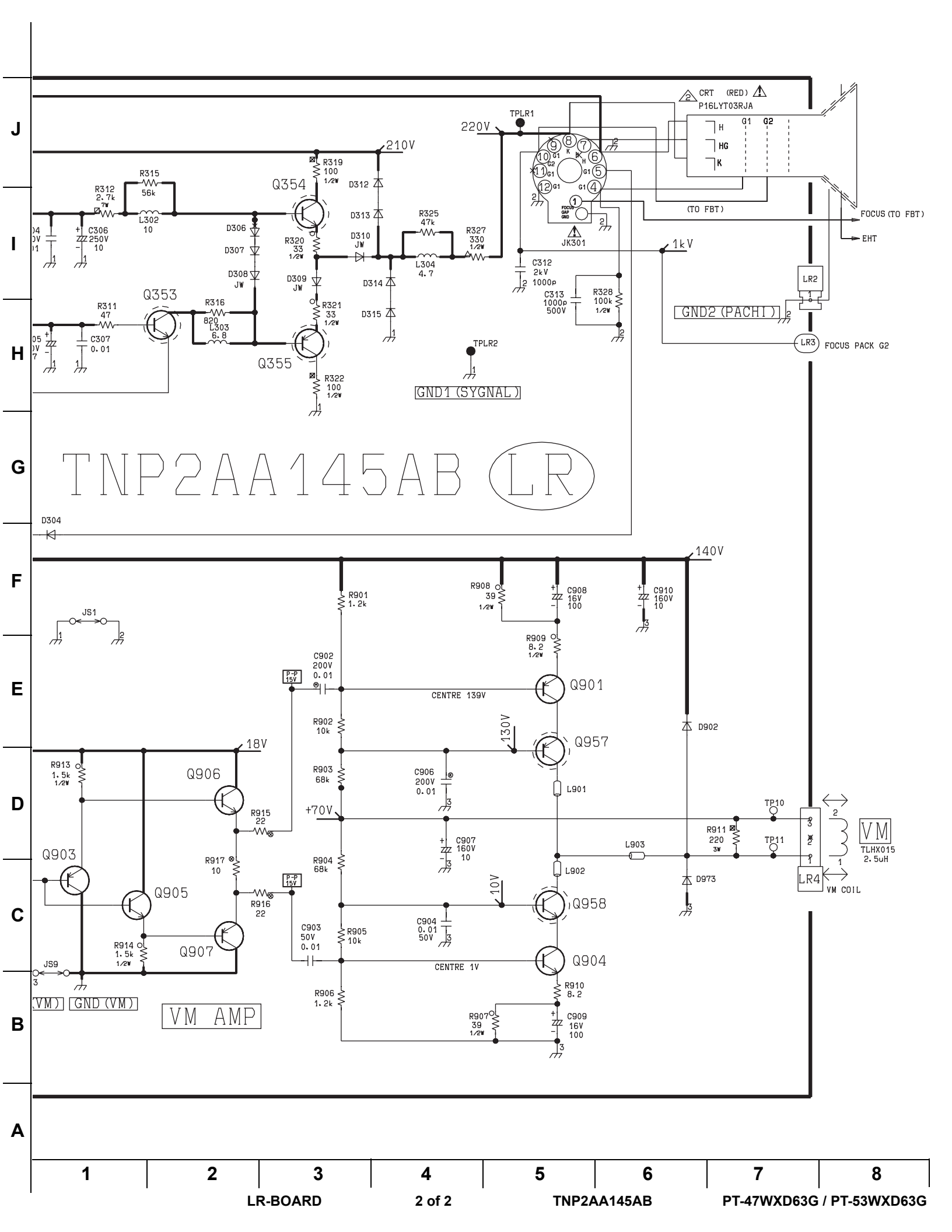
LG-BOARD

TNP2AA146

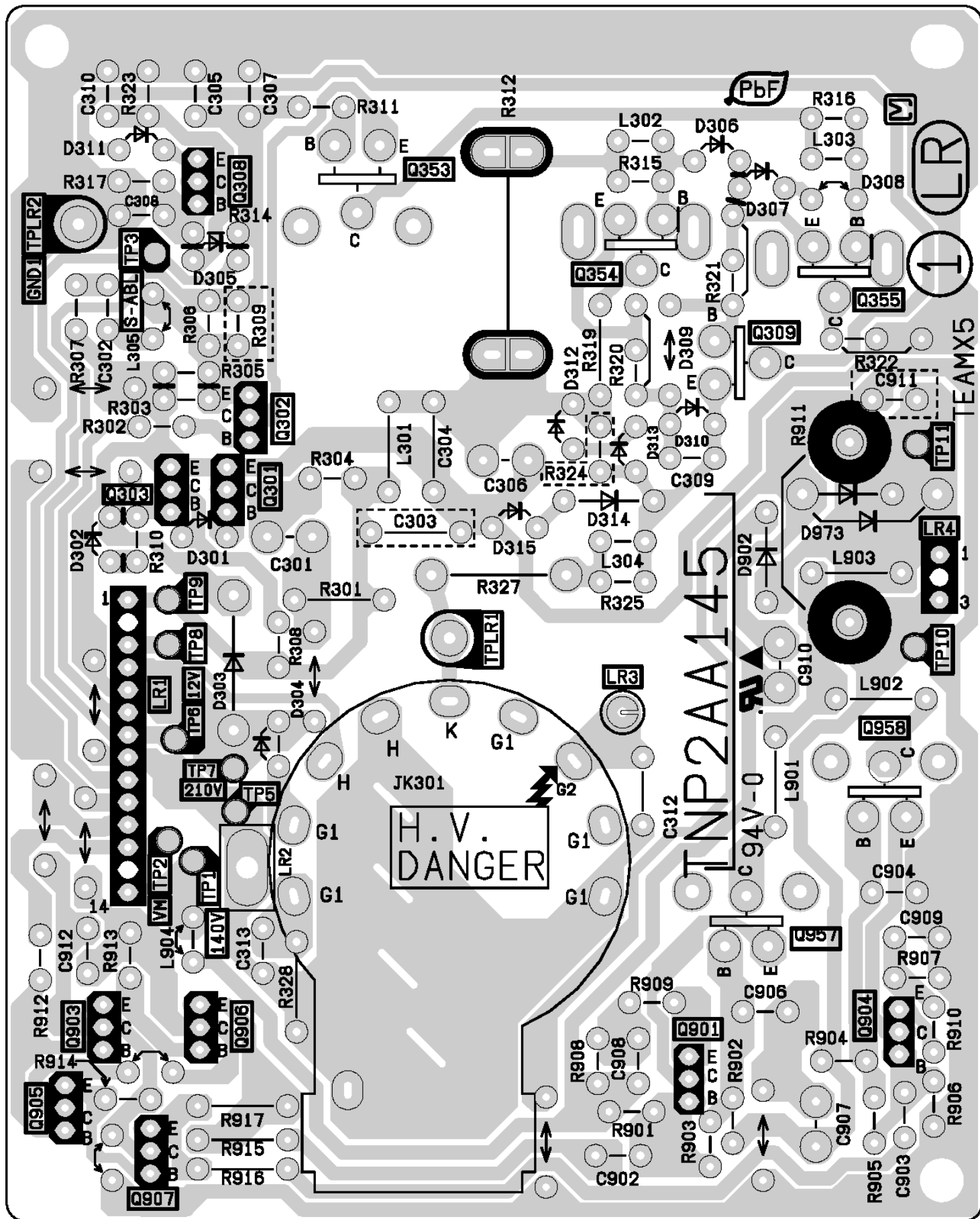
PT-47WXD63G / PT-53WXD63G

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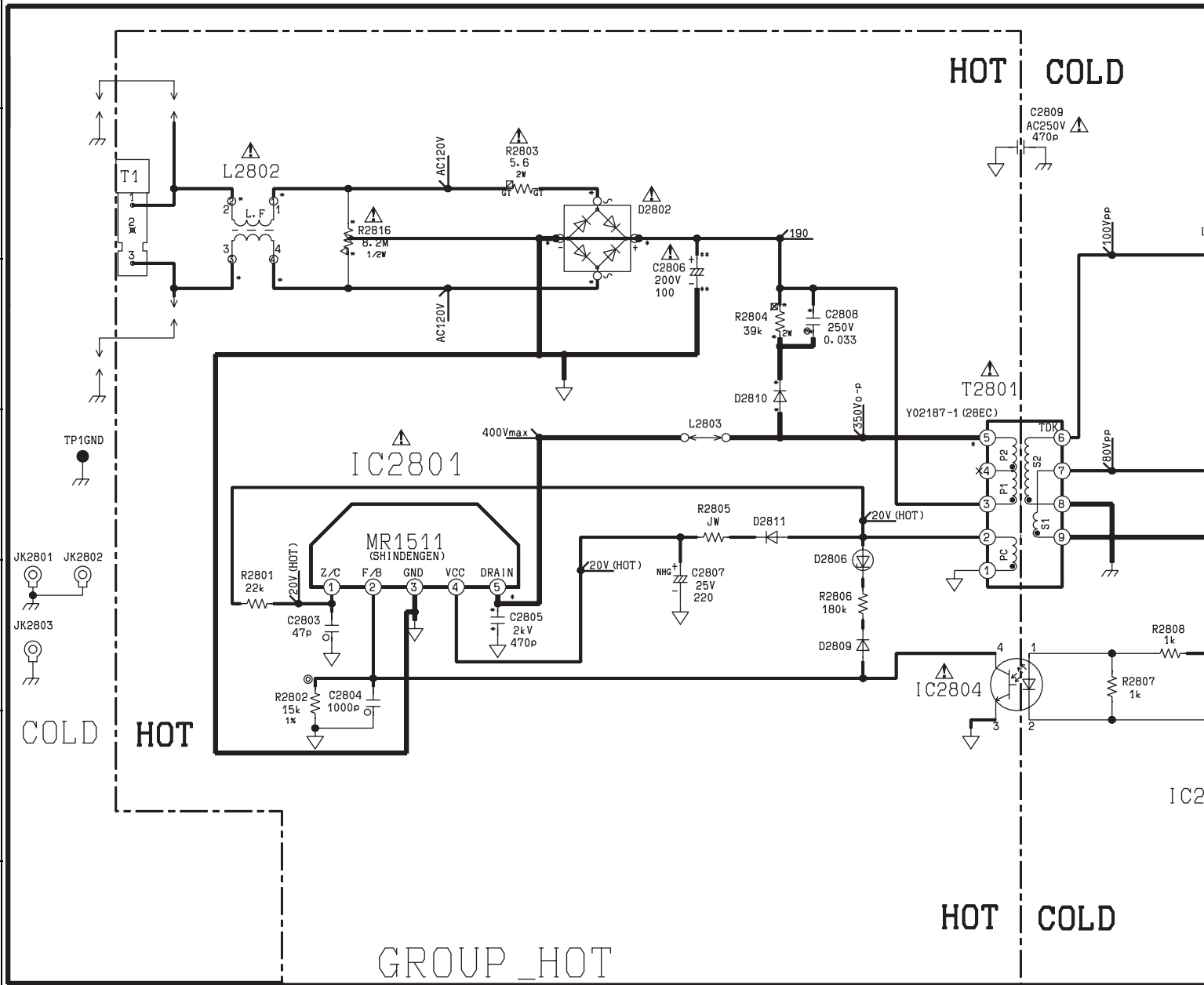


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LR-BOARD

TNP2AA145

PT-47WXD63G / PT-53WXD63G







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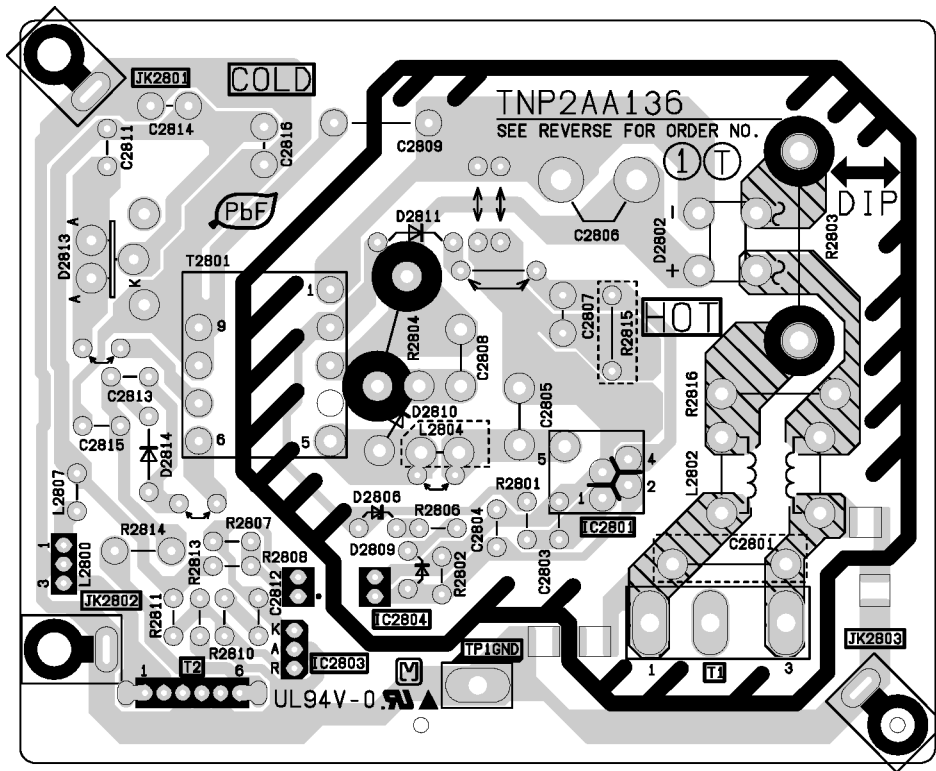
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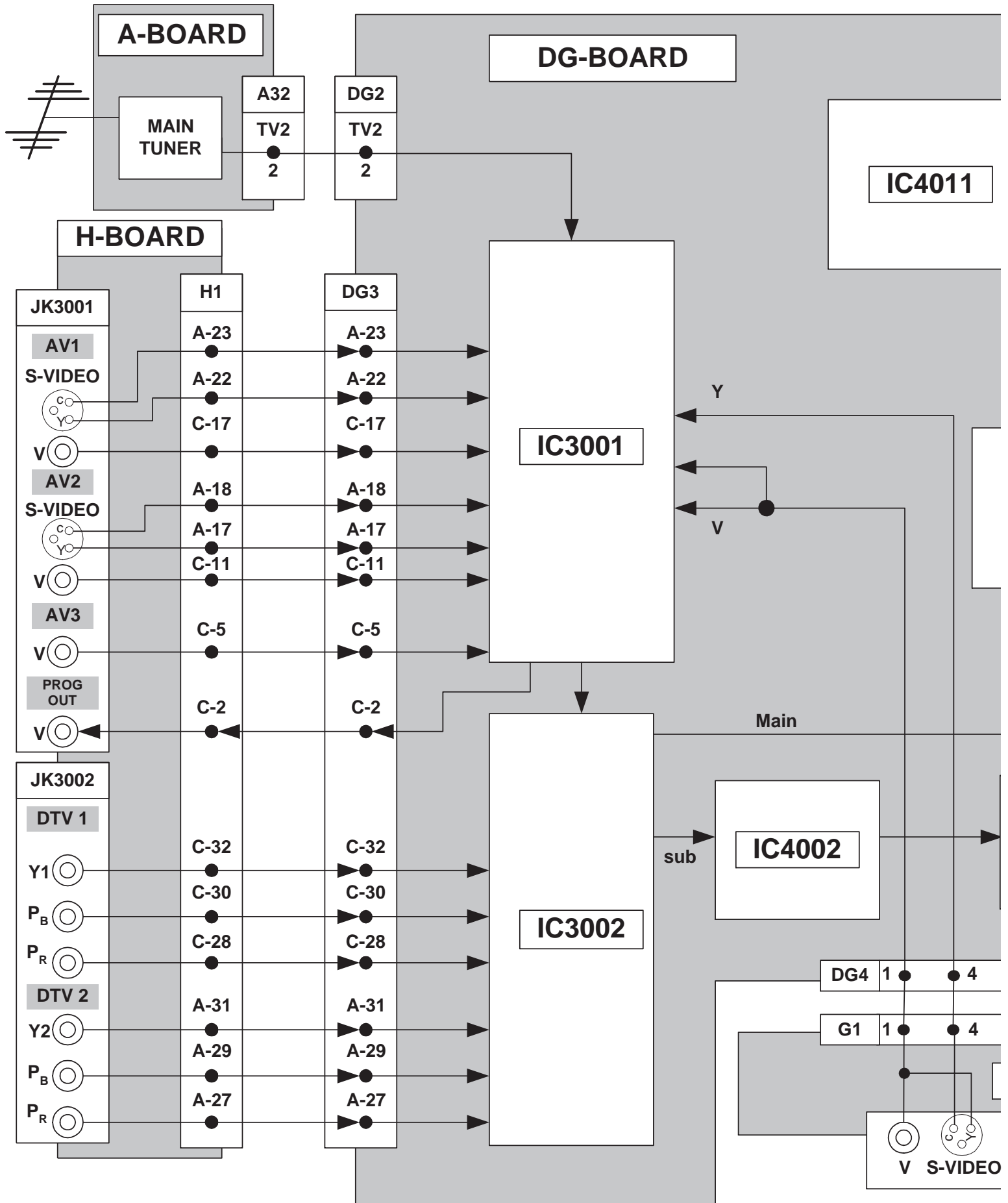
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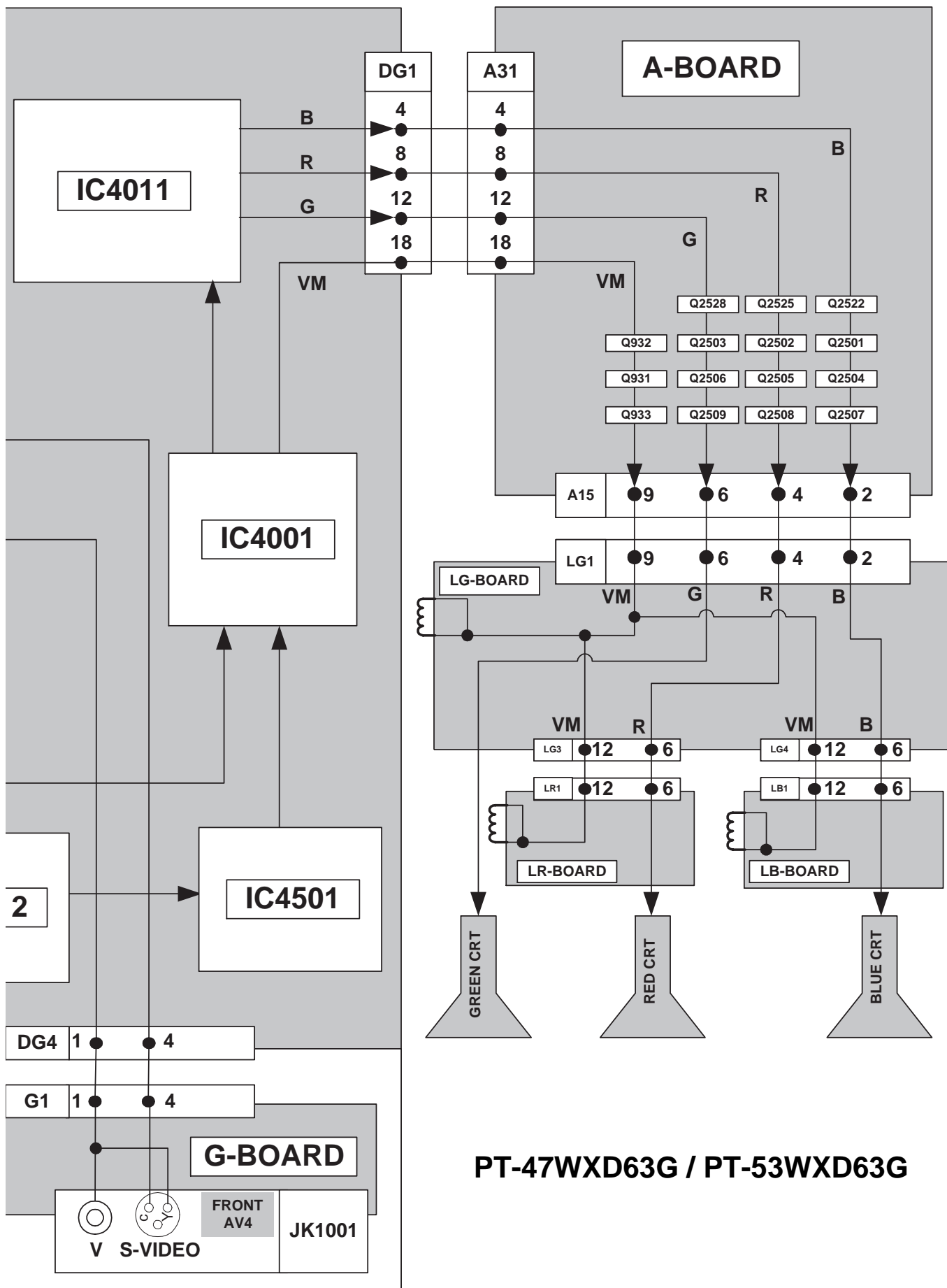
T-BOARD

TNP2AA136

PT-47WXD63G / PT-53WXD63G

# Video signal path block diagram





## A - BOARD - TNP2AH051

IC1101		IC2302				IC2451				IC2851		IC873	
1	0.00	1	-23.00	14	-21.60	1	4.40	16	8.90	1	0.00	1	19.40
2	0.00	2	-23.00	15	0.00	2	4.50	17	4.70	2	10.40	2	2.60
3	0.00	3	0.30	16	-5.50	3	4.50	18	0.00	3	7.70	3	0.00
4	0.00	4	22.10	17	0.00	4	4.50	19	4.30	4	5.00	4	1.30
5	2.30	5	9.60	18	0.00	5	4.50	20	4.10	5	6.70	5	6.70
6	2.60	6	5.00	19	0.00	6	4.50	21	4.50	IC871		IC874	
7	0.00	7	0.00	20	0.00	7	4.50	22	4.50				
8	3.30	8	2.60	21	9.50	8	4.50	23	4.50				
IC1112		9	0.00	22	22.10	9	1.60	24	4.50				
		10	0.00	23	0.20	10	4.50	25	4.50				
		11	0.00	24	-23.00	11	1.60	26	4.50	1	19.40	1	19.40
		12	5.30	25	-12.50	12	1.60	27	4.50	2	5.10	2	5.10
		13	0.00			13	4.90	28	4.50	3	0.00	3	0.00
						14	4.90	29	4.50	4	1.30	4	1.30
						15	0.00	30	4.40	5	6.70	5	6.70
										IC872			
										1	19.40		
										2	9.00		
										3	0.00		
										4	9.00		
										5	2.30		

## A - BOARD - TNP2AH051

	Q2301	Q2302	Q2304	Q2451	Q2452	Q2501	Q2502	Q2503	Q2304	
B	19.50	19.50	0.10	4.50	4.50	2.80	2.80	2.90	10.90	
C	-0.10	-1.30	19.50	8.90	8.90	10.90	10.90	10.90	3.30	
E	13.50	13.50	0.20	3.80	3.80	2.20	2.20	2.30	11.50	
	Q2505	Q2506	Q2507	Q2508	Q2509	Q2510	Q2516	Q2517	Q2522	
B	10.90	10.90	3.30	3.30	3.50	6.30	18.80	0.00	3.40	
C	3.30	3.50	0.00	0.00	0.00	0.00	19.40	0.00	11.40	
E	11.50	11.50	3.90	4.00	4.10	4.00	18.60	0.70	2.80	
	Q2525	Q2528		Q2801		Q2802	Q2803	Q931	Q932	Q933
B	3.40	3.50	G	0.00	B	0.70	2.90	6.70	5.00	19.20
C	11.40	11.40	D	10.30	C	0.00	10.90	18.80	6.10	19.40
E	2.80	2.90	S	10.40	E	0.00	2.30	6.10	4.40	-0.70

## D - BOARD - TNP2AH056

IC1501	IC701	IC7001				↓IC801	IC811
1 ....10.80 2 ....0.00 3 ....0.00 4 ....0.00 5 ....2.40 6 ....2.40 7 .....1.40 8 ....12.00	1 .....0.20 2 .....5.30 3 .....4.70 4 .....0.00 5 .....1.60 6 .....0.70 7 .....9.50 8 ....12.00	1 .....0.00 2 .....0.00 3 ... -19.40 4 ... -20.50 5 ....19.30 6 ....-0.30 7 ....-0.30 8 ... -20.40 9 ....-0.30	10 .....19.30 11 .....0.00 12 ... -20.50 13 .....0.00 14 .....0.00 15 ....-0.20 16 ....-0.20 17 ... -20.50 18 .....0.00			1 .....1.40 2 .....0.40 3 .....0.00 4 .....0.00 5 .....0.00 6 .....5.70 7 .....20.50 8 .....0.00 9 .....6.00	1 ....19.50 2 ....18.50 3 ↓ ...0.00 4 ↓ ...5.90
IC451	IC7002				IC802	IC805	
1 .....0.00 2 ....17.30 3 ...-17.00 4 ...-18.50 5 ....-0.10 6 ....17.10 7 .....0.00		1 .....0.00 2 .....0.00 3 ... -19.40 4 ... -20.50 5 ....19.30 6 ....-0.10 7 ....-0.10 8 ... -20.40 9 ....-0.10	10 .....19.30 11 ....-0.40 12 ....-0.40 13 .....0.20 14 .....0.00 15 ....-0.20 16 ....-0.00 17 ... -20.50 18 .....0.00		1 ...139.40 2 ....18.50 3 .....0.00	1 ....19.70 2 .....0.00 3 ....12.00	

Q1503	Q1504	Q1505	Q406	Q501	Q509	Q510	Q512
B 9.80 C 6.20 E 10.40	12.00 404.80 11.40	6.10 10.40 6.60	-0.70 0.00 0.00	5.30 16.50 0.00	29.10 138.90 31.60	31.60 138.90 31.10	4.40 8.30 3.80
Q513	Q551	Q606	Q701	Q7006	Q7007	Q7060	Q7061
B 0.30 C 5.30 E 0.00	-0.20 -98.90 0.00	0.00 9.80 0.00	G 9.50 D 27.00 S 0.00	B -20.50 C -19.40 E -20.50	-20.50 -19.40 -20.50	19.30 0.00 19.50	-20.50 19.30 -20.70
Q801	Q802	Q803	Q854				
G 5.50 S 0.01 D 43.30	B 0.70 C 0.20 E 0.00	20.50 0.00 20.50	138.90 0.00 139.20				

## LR - BOARD - TNPA145AB

Q301	Q302	Q303	Q353	Q354	Q355	Q901
B 0.00 C 215.00 E 0.00	0.60 0.00 0.00	0.60 0.00 0.00	12.00 174.70 11.50	176.30 218.30 175.90	175.00 0.00 175.60	137.90 130.10 138.50
Q903	Q904	Q905	Q906	Q907	Q957	Q958
B 0.10 C 0.00 E 0.80	1.00 8.90 0.30	0.10 19.30 0.00	0.70 19.30 0.40	0.00 0.00 0.40	129.40 69.60 130.00	9.43 69.60 8.86

## LG - BOARD - TNPA146AB

IC880	Q331	Q373	Q374	Q375	Q934	Q935	Q936	Q937
1 ....19.30 2 .....0.00 3 ....12.00	B 4.10 C 11.60 E 3.80	12.00 170.70 11.60	172.10 218.80 171.60	171.00 0.40 171.60	0.00 0.00 0.70	0.00 19.30 0.00	0.70 19.30 0.40	0.00 0.00 0.40
Q938	Q941	Q951	Q952	Q953	Q955	Q956		
B 137.90 C 130.10 E 138.60	1.00 9.00 0.30	-0.90 19.30 0.00	-1.10 19.30 0.00	-1.10 19.30 0.00	129.70 70.00 130.10	9.60 70.00 9.00		

## LB - BOARD - TNPA147AB

	Q361	Q362	Q363	Q364	Q365	Q366	Q368	Q393	Q394
B	5.20	4.50	3.90	3.90	5.90	5.10	0.00	12.00	176.10
C	12.00	12.00	11.50	0.00	12.00	12.00	0.00	174.80	218.00
E	4.50	3.90	3.70	3.50	5.30	4.50	0.40	11.60	175.70

	Q395	Q959	Q960	Q961	Q964	Q965	Q966	Q967	Q968
B	174.60	129.40	9.60	137.90	1.00	0.00	0.00	0.70	0.00
C	0.40	71.00	71.00	130.00	9.00	0.00	19.30	19.30	0.00
E	175.40	130.00	9.10	138.50	0.40	0.70	0.00	0.40	0.40

## T - BOARD - TNP2AA136

IC2801↓	IC2803	IC2804
1 .....3.30	1 K ... 8.20	1 ..... 9.20
2 .....1.90	2 R ... 2.40	2 ..... 8.20
3 .....0.00	3 A ... 0.00	3 ↓..... 0.00
4 ....15.70		4 ↓..... 1.90
5 .....-8.20		

# Connector Voltages For Non-serviceable Boards

## DC - BOARD - TNP2AA151

D21--DC1		D22--DC2		D23--DC3	
1	..... 0.00	1	..... 0.00	1	..... 19.50
2	..... 4.90	2	..... -0.10	2	..... 0.00
3	..... 4.90	3	..... -0.30	3	..... 0.00
4	..... 0.00	4	..... -0.10	4	..... 0.00
5	..... 4.90	5	..... -0.30	5	..... 0.00
6	..... 0.50	6	..... -0.10	6	..... 0.00
7	..... 0.00	7	..... -0.30	7	..... 4.80
8	..... 0.50	8	..... 0.00	8	..... 4.80
9	..... 0.10	9	..... 0.00	9	..... 0.00
10	..... 5.00	10	..... -20.10	10	..... 1.40

## DV - BOARD - TNP2AA133

A51--DV1			
1	..... 0.00	14	..... 2.10
2	..... 2.50	15	..... 0.00
3	..... 0.00	16	..... 2.50
4	..... 2.50	17	..... 0.00
5	..... 0.00	18	..... 3.30
6	..... 5.00	19	..... 3.30
7	..... 5.00	20	..... 3.30
8	..... 0.00	21	..... 0.00
9	..... 8.90	22	..... 2.90
10	..... 8.90	23	..... 4.20
11	..... 0.00	24	..... 4.80
12	..... 2.10	25	..... 4.80
13	..... 0.00		

## JG - BOARD - TNP2AA140

JG3--DG7			
1	..... 0.00	8	..... 3.00
2	..... 0.00	9	..... 0.00
3	..... 3.30	10	..... 3.30
4	..... 0.00	11	..... 3.30
5	..... 0.70	12	..... 0.00
6	..... 0.00	13	..... 8.80
7	..... 0.50	14	..... 4.90

## DG - BOARD - TNP2AA132

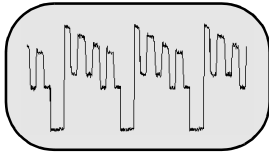
A31--DG1							
1	..... 2.10	18	..... 0.00	35	..... 0.50	52	..... 2.50
2	..... 0.00	19	..... 0.00	36	..... 8.90	53	..... 0.30
3	..... 0.00	20	..... 0.00	37	..... 8.90	54	..... 5.00
4	..... 3.40	21	..... 0.00	38	..... 0.30	55	..... 3.00
5	..... 1.40	22	..... 5.00	39	..... 0.50	56	..... 0.00
6	..... 0.00	23	..... 5.00	40	..... 0.00	57	..... 3.30
7	..... 0.10	24	..... 0.00	41	..... 7.80	58	..... 0.00
8	..... 3.10	25	..... 0.00	42	..... 0.00	59	..... 0.00
9	..... 4.80	26	..... 2.70	43	..... 0.00	60	..... 0.00
10	..... 0.00	27	..... 0.00	44	..... 0.00	61	..... 3.30
11	..... 4.80	28	..... 0.00	45	..... 2.60	62	..... 2.80
12	..... 3.40	29	..... 0.10	46	..... 2.50	63	..... 3.20
13	..... 0.00	30	..... 0.70	47	..... 1.80	64	..... 4.80
14	..... 0.00	31	..... 0.50	48	..... 2.50	65	..... 4.90
15	..... 0.00	32	..... 0.70	49	..... 0.30		
16	..... 1.70	33	..... 0.00	50	..... 2.50		
17	..... 0.00	34	..... 0.70	51	..... 0.00		

A32--DG2							
1	..... 1.50	14	..... 2.10	27	..... 3.80	40	..... 2.20
2	..... 2.10	15	..... 0.00	28	..... 1.10	41	..... 0.00
3	..... 5.00	16	..... 0.00	29	..... 3.80	42	..... 2.20
4	..... 1.50	17	..... 0.00	30	..... 0.80	43	..... 8.90
5	..... 0.10	18	..... 2.20	31	..... 4.20	44	..... 8.90
6	..... 2.60	19	..... 0.00	32	..... 4.90	45	..... 5.00
7	..... 0.00	20	..... 2.20	33	..... 4.80	46	..... 5.00
8	..... 2.30	21	..... 0.00	34	..... 2.90	47	..... 0.00
9	..... -0.10	22	..... 3.80	35	..... 3.30	48	..... 2.50
10	..... 3.30	23	..... 0.00	36	..... 3.30	49	..... 0.00
11	..... 3.00	24	..... 3.80	37	..... 3.30	50	..... 2.50
12	..... 3.30	25	..... 3.30	38	..... 2.60		
13	..... 0.00	26	..... 1.10	39	..... 0.00		

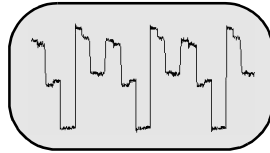
## DT - BOARD - TNP2AA144

A41--JK8007 (DT-Board)							
1	.... 0.00	18	..... 1.10	35	..... 3.30	52	.... 10.00
2	.... 0.80	19	..... 0.30	36	..... 3.00	53	.... 10.00
3	.... 30.10	20	..... 3.80	37	..... 3.30	54	.... 0.00
4	.... 30.00	21	..... 0.00	38	..... 0.00	55	.... 0.00
5	.... 0.00	22	..... 3.80	39	..... 0.00	56	.... 0.00
6	.... 0.00	23	..... 0.00	40	..... 2.40	57	.... 0.00
7	.... 0.00	24	..... 2.20	41	..... 0.00	58	.... 10.00
8	.... 0.00	25	..... 0.70	42	..... 2.60	59	.... 10.00
9	.... 0.00	26	..... 2.20	43	..... 0.00	60	.... 10.00
10	.... 0.80	27	..... 0.70	44	..... 1.50	61	.... 10.00
11	.... 0.00	28	..... 0.00	45	..... 0.00	62	.... 0.00
12	.... 1.10	29	..... 0.70	46	..... 4.80	63	.... 0.00
13	.... 0.00	30	..... 0.00	47	..... 0.00	64	.... 7.80
14	.... 1.10	31	..... 3.30	48	..... 4.80	65	.... 0.00
15	.... 0.00	32	..... 0.00	49	..... 0.00		
16	.... 0.80	33	..... 3.30	50	.... 10.00		
17	.... 3.30	34	..... 2.10	51	.... 10.00		

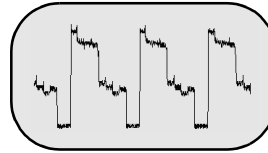
# A-Board TNP2AH051



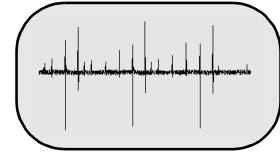
① 6.08 Vp-p  
A15 PIN 2 (BLUE OUT)



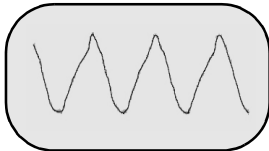
② 5.60 Vp-p  
A15 PIN 4 (RED OUT)



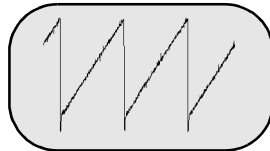
③ 6.08 Vp-p  
A15 PIN 6 (GREEN OUT)



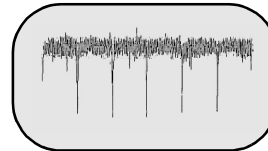
④ 2.74 Vp-p  
A15 PIN 9 (VM OUT)



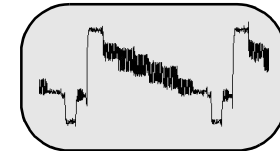
⑤ 5.84 Vp-p  
A15 PIN 11 (S-ABL)



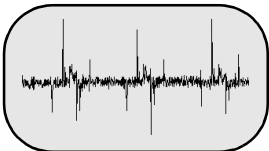
⑥ 2.04 Vp-p  
A4 PIN 1 (V-SAW)



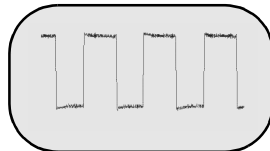
⑦ .292 Vp-p  
A4 PIN 4 (EHT ADJ)



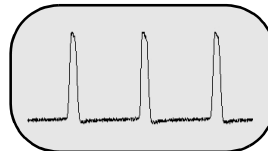
⑧ 1.08 Vp-p  
A32 PIN 14 (MAIN VIDEO)



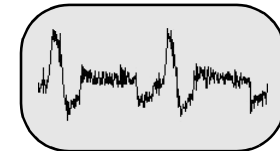
⑨ 0.26 Vp-p  
A2 PIN 1 (HD/SD)



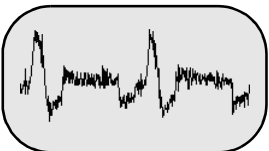
⑩ 3.56 Vp-p  
A2 PIN 3 (H-DRV)



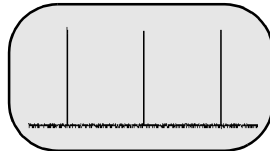
⑪ 5.65 Vp-p  
A2 PIN 5 (FBP)



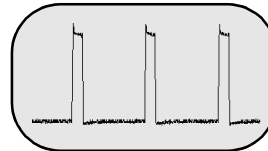
⑫ 0.178 Vp-p  
A2 PIN 11 (SOS3 CONV)



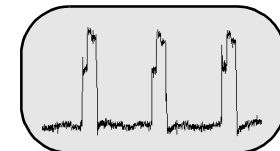
⑬ 0.176 Vp-p  
A2 PIN 15 (SOS)



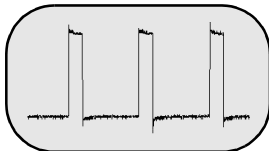
⑭ 3.36 Vp-p  
A3 PIN 9 (VD TO CONV)



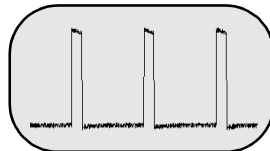
⑮ 3.36 Vp-p  
A3 PIN 11 (HD TO CONV)



⑯ 0.472 Vp-p  
A3 PIN 13 (H-SYNC)



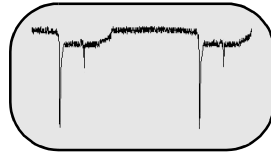
⑰ 3.52 Vp-p  
A3 PIN 15 (HBLK)



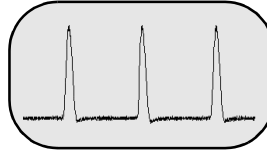
⑱ 3.6 Vp-p  
A3 PIN 16 (EW)



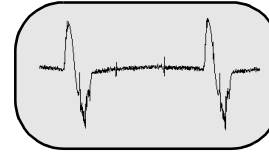
## D-Board TNP2AH056



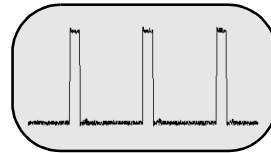
①9 12.6 Vp-p  
Q551-B



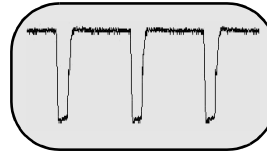
②0 1.56 kVp-p  
Q551-C



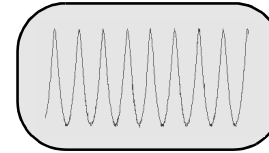
②1 0.65 Vp-p  
IC701 PIN 3



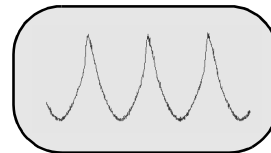
②2 3.60Vp-p  
IC701 PIN 6



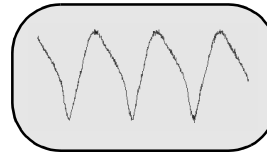
②3 13.4 Vp-p  
IC701 PIN 7



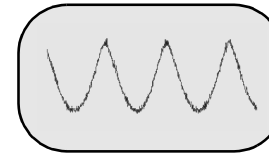
②4 2.28 Vp-p  
D23 PIN 10 (DAF)



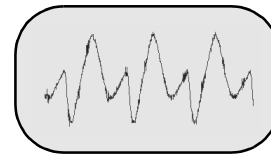
②5 2.02 Vp-p  
D22 PIN 2 (BV)



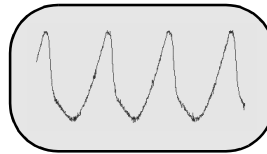
②6 2.04 Vp-p  
D22 PIN 3 (BH)



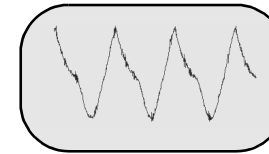
②7 1.44 Vp-p  
D22 PIN 4 (GV)



②8 .824 Vp-p  
D22 PIN 5 (GH)

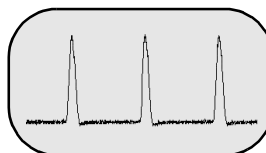


②9 1.94 Vp-p  
D22 PIN 6 (RV)



③0 1.17 Vp-p  
D22 PIN 7 (RH)

## LG-Board TNP2AA146



③1 28.4 Vp-p  
TP22 (HEATER)